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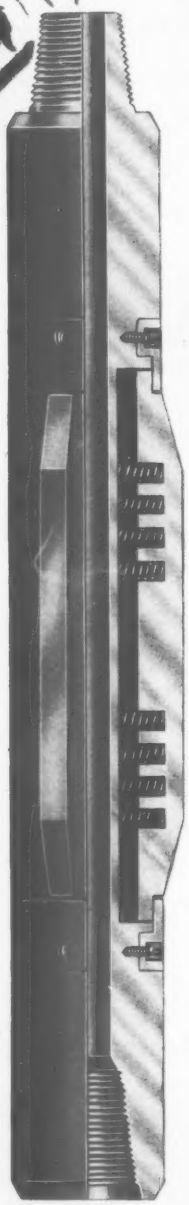

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Trends

Crude-Oil Production By States — Page 84

CRUDE-OIL STOCKS 239,869,000 bbl. as of Nov. 20—up 1,465,000 bbl. One year ago 235,305,000 bbl.

GASOLINE STOCKS 68,996,000 bbl. as of Nov. 20—up 270,000 bbl. One year ago 74,745,000 bbl.

RESIDUAL FUEL-OIL STOCKS 62,662,000 bbl. as of Nov. 20—up 15,000. One year ago 77,796,000.

GAS OIL AND DISTILLATE 45,772,000 as of Nov. 20—up 456,000 bbl. One year ago 50,085,000.

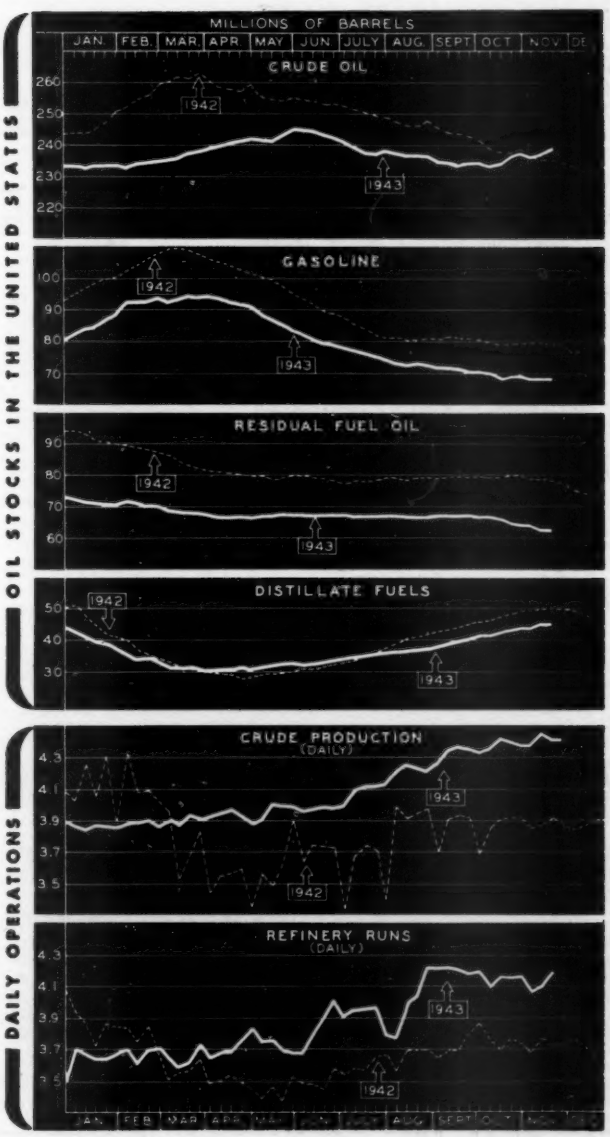
CRUDE-OIL PRODUCTION 4,406,350 bbl. daily average—down 7,710 bbl. One year ago 3,887,225.

REFINERY RUNS 4,192,000 bbl. daily week ended Nov. 20—up 58,000 bbl. One year ago 3,731,000.

ECONOMISTS of the petroleum industry are stressing the necessity of separating current statistical data for California and the West Coast from the remainder of the United States. National figures, it is pointed out, are of little value in reflecting operating conditions until they are broken down into the two parts. For example, the A.P.I. report for the week ending November 20 shows an increase of 461,000 bbl. daily or 12.3 per cent in refinery operations over the corresponding week of 1942. The crude runs to stills at California refineries for the 2 weeks were practically the same. A similar comparison applies to the production of crude oil with California's output last week representing a 5.2 per cent gain over a year ago and a 14.2 per cent growth in the remainder of the United States.

THIS comparison between the West Coast operations and the rest of the country increases in importance when stock data are considered. Stocks of refinable crude oil in California are practically the same as a year ago with inventories of heavy crudes 18 per cent less. In the rest of the country crude-oil stocks have been increasing in recent weeks. In refined products the California stock position is not strong. The latest A.P.I. report shows that California's stocks of all gasolines have decreased 18 per cent from a year ago with a decline of 29 per cent in residual fuel oils. The decrease of 16 million barrels in fuel-oil stocks is greater than the national reduction and the decline in gasoline accounts for about 50 per cent of the total.

OBVIOUS conclusions are derived from these comparisons by the industry's and the Government's analysts. The West Coast is in need of more crude oil to support the war program of the Pacific and to maintain the essential civilian activities. It is stated that the California plants can refine substantially more crude if it is made available. The California fields cannot make up the deficit at this time. This accounts for the plan to move increasing quantities of New Mexico and West Texas crudes to California by rail with the possibility of large shipments from other points in the Western Hemisphere. Relative to the tank-car movement of crude oil to California and to District 2, action in the matter of the Government paying the additional transportation charges, explained on this page in the November 18 issue, has been postponed pending a decision as to whether the payments will be made to refiners now in the excess-profit classification.



Wholesale Cooperatives Increase Manufacturing Capacity Fifty Per Cent

AN increase of nearly 50 per cent in the refining capacity of wholesale cooperatives through acquisition of National Refining Co.'s Coffeyville, Kans., plant by the Cooperative Refinery Association was announced this week. Details of the National sale to the Cooperative company are published on page 75.

Wholesale cooperatives currently own and operate nine refineries in Kansas, Nebraska, Montana, Indiana, Oklahoma and Louisiana with a rated crude-oil capacity of 52,000 bbl. daily. The four cooperatively owned plants in Kansas have combined crude-oil capacity of 33,000 bbl. daily, representing nearly 63 per cent of the facilities held by the seven Middle West associations which are domiciled in Missouri, Ohio, Minnesota, Wisconsin and Nebraska.

Plant Under Expansion

The Coffeyville refinery currently is undergoing extensive expansion under a provision of a Defense Plant Corp., commitment calling for expenditure of $4,820,000 for aviation-gasoline facilities and auxiliary equipment. Expansion of the crude-oil distillation capacity from its previous level of 9,500 bbl. daily to the projected figure of 13,500 bbl. is part of the program.

Last July, the cooperative refinery movement received a sharp stimulant with the purchase of Globe Oil & Refining Co.'s plant at McPherson, Kans. The plant has rated capacity of 15,000 bbl. daily and an extreme capacity of 17,500 bbl. It was purchased by the National Cooperative Refinery Association, a federation of five wholesale associations incorporated in Kansas last July 7. Members of the National Cooperative are Central Cooperative Wholesale, Superior, Wis.; Midland Cooperative Wholesale, Minneapolis; Farmers Union Central Exchange, Inc., St. Paul, Minn.; Farmers Union State Exchange, Omaha, Neb., and Consumers Cooperative Association, North Kansas City, Mo. Consumers Cooperative is the parent organization of the Cooperative Refinery Association which last week confirmed its purchase of the National Refining Co. plant.

Purchase of the National Refining Co.'s plant, pipe-line facilities and certain producing properties in the vicinity of McPherson added substantially to cooperative participation in producing and transportation facilities. Previous to last week's purchase which included 269 oil wells and 768 miles of gathering and trunk pipe lines, the cooperative associations were comparatively small factors in Kansas producing operations, although Consumers Cooperative has been active in recent months in the acquisition and development of properties. The Cooperative Refinery Association, manufacturing subsidiary of Consumers Cooperative, operates two smaller refineries at Scottsbluff, Neb., and at Phillipsburg, Kans.

Conflicting Reports Cloud Issue of Freight Adjustment for District 2

WASHINGTON, D. C. — The question of a freight-rate adjustment on tank-car movement of crude oil from West Texas to the Middle West remained unanswered this week.

Conflicting reports were circulated on status of negotiations between the Petroleum Administration for War and Defense Supplies Corp., a subsidiary of the Reconstruction Finance Corp.

One report was that DSC had changed its policy and that freight adjustments would be disallowed to oil companies whose earnings place them in the excess-profits bracket. There was no confirmation on this report, however, and other sources claimed that Jesse Jones, secretary of commerce, soon would issue a schedule covering tank-car shipments of approximately 42,000 bbl. daily from West Texas to District 2 refiners.

Transportation and supply committees in District 2 have determined that tank-car movement of crude oil from West Texas to Middle West refiners will cost an average of 13 cents per barrel more than for shipping a similar volume by pipe line. Thus, DSC would become obligated for approximately $5,460 daily until next April 1 when Stanolind Pipe Line Co.'s 16-in. line is completed from Slaughter, Tex., to Drumright, Okla.

Available Capacity Idle

Daily movement of 42,000 bbl. of West Texas crude oil to District 2 would enable Middle West refiners to engage 25 per cent of the currently idle manufacturing capacity, it was pointed out this week by W. W. Vandeveer, PAW director in charge, in an address before the South Dakota Petroleum Association. The program for tank-car shipments of 42,000 bbl. daily is based on the maximum ability of District 2 refiners for processing sour crude oils with existing facilities.

Meanwhile, the DSC announced that as of October 31 it had disbursed $230,338,447 on claims of petroleum compensatory adjustments, covering shipments to the East Coast. Trustees of the plan have returned $126,511,306 for the equitable sharing of revenues and extra transportation expenses in part reimbursement of DSC outlays.

COOPERATIVE REFINING ORGANIZATIONS IN THE UNITED STATES

Company and plant location—	Daily capacity— Crude oil	Cracking
Cooperative Refinery Association, Coffeyville, Kans.	13,500	2,500
Cooperative Refinery Association, Scottsbluff, Neb.	1,350	160
Cooperative Refinery Association, Phillipsburg, Kans.	3,500	640
National Cooperative Refinery Association, McPherson, Kans.	15,000	4,450
Farmers Union Central Exchange, Inc., Laurel, Mont.	5,500	3,000
Indiana Farm Bureau Cooperative Association, Mount Vernon, Ind.	3,200	.....
Midland Cooperative Wholesale, Cushing, Okla.	5,000	800
Missouri Farm Association, Chanute, Kans.	1,000	1,000
Ohio Farm Bureau Cooperative Association, Meraux, La.	4,000	.....
Total	52,050	12,550

Truman Committee Preparing Canol Report, May Advise Work Stoppage

by Henry D. Ralph

WASHINGTON, D. C.—A full and critical report on the Army's $134,000,000 Canol project is expected to be published by the Truman committee of the Senate within 2 or 3 weeks, following the close of public hearings on the subject last week.

From observations made by committee members during the hearings it is expected that the committee will recommend that the project be dropped immediately, or that the agreements with Canada be renegotiated or both.

Although Undersecretary of War Robert P. Patterson insisted that Canol is a sound and necessary project, the Army furnished no evidence at the public hearings to support this contention, and committee members were open in their hostility to the entire venture. The hearings brought forth much criticism and it was evident that the committee has obtained considerably more unfavorable material during its earlier investigation and closed sessions.

Staff investigators promised that a digest of much of the material they have collected but which was not put into the public record will be included in the committee report. There are hints that such information points to great waste of money, materials and manpower due to the haste with which the project was undertaken and failure to obtain competent advice on technical problems.

One question not answered at the public hearings was the Army's reason for adopting the Canol project without adequate study and its insistence on going through with it despite objections from many quarters. The only explanation given by the War Department was that Canol was a matter of high strategy and it was considered important to obtain even a small amount of oil in Northwest Canada at almost any effort or expense.

Most of the questioning at the hearings was done by chief counsel Hugh Fulton and Senators Ferguson of Michigan and Kilgore of West Virginia, who constituted a subcommittee which had previously interviewed all the witnesses. It was apparent that these three had much more information than the witnesses were giving in open session, since they did not attempt to elicit all details but were content to bring out certain aspects for the public record. Many of the "juicy bits" of information were dropped by the questioners in asking witnesses if they had heard of certain details.

Final witnesses were Maj. Gen. Arthur H. Carter, fiscal director of the Army Service Forces, and Brig. Gen. Walter B. Pyron, chairman of the executive committee of the Army-Navy Petroleum Board. Although both men were present at the conception of Canol, both denied that their expert opinions had been asked as to its feasibility.

No Fiscal Advice Asked

General Carter, who before the war was partner of a prominent firm of public accountants, said that his office was the scene of the conference on April 29, 1942, at which the Canol project was recommended. He said he had been asked by Dean James H. Graham of the Kentucky University School of Engineering, a civilian adviser to General Somervell, to ask the Standard Oil Co. of New Jersey to bring in experts of its Canadian subsidiary, Imperial Oil, Ltd. He said he did not know why Graham asked him to make this contact nor why his office was used for the conference, and that his advice as an accountant and as fiscal officer was not asked.

General Pyron, formerly vice president of Gulf Oil Corp., said he was present at the April 29 conference but was not informed of the details of the proposed Canol development, although he had known that Graham was interested in the small oil field at Norman Wells. At that conference Imperial Oil men said frankly that they could not give assurance that the Norman Wells field could be developed to product 3,000 bbl. per day, Pyron testified. However, from his own knowledge of the geology he felt sure that this much oil could be located and his judgment has been vindicated by the fact that capacity there is now believed to be 20,000 bbl. per day, he said.

Pyron told the committee that his advice was not asked regarding construction of a pipe line or a refinery. Under questioning he said he thought the crude would make 100-octane gasoline if adequate refinery equipment were used, but he finally admitted that it might be necessary to ship in from the United States alkylates, hydrocodimers, and tetraethyl lead in perhaps as great volume as the quantity of aviation base stock which would be manufactured from Norman Wells crude. He insisted that his opinion was not asked about the type and location of the refinery and pipe line, type of refined products to be produced, or length of time required to construct the project. He

James H. Graham, left, dean of engineering, University of Kentucky, recommended Army adoption of the Canol project. Brig. Gen. Walter B. Pyron defended Canol project, although admitting he was not consulted before approval was issued by higher ranking officers

did say that he thought the Army Engineers could have completed the entire project by the fall of 1942, as contemplated by Graham, if they had used airplanes to fly in the equipment and had put enough men on the job.

Pyron was asked his opinion of the contract with the Noble Drilling Co. to drill 100 wells of 1,200-ft. depth at cost plus $290,000 fee. He said this was not excessive in view of the conditions, since it might be necessary to drill some wells very deep, and that if the contract is carried to completion the company will net a profit of only 5 per cent of cost, and will lose money if the contract is cancelled.

Production Capacity Disclosed

Pyron said the Norman Wells field will now produce 20,000 bbl. a day and that the Army expects to use it, even though the pipe line to White Horse now under construction will have a capacity of only 3,000 bbl. per day. However, he said he did not know how this oil would be used and had not heard of any plans for expanding the pipe line or refinery.

Questioning brought out that the products pipe lines already constructed from Skagway to White Horse and most of the way along the Alaska Highway south to Watson Lake and north to Fairbanks have suffered many serious breaks due to extreme changes in temperature. Pyron said there will be plenty of breaks in such a line but he did not believe the number has been excessive to date. He also said that since the directive to build Canol he has been consulted by the Army Engineers on various problems of construction.

This led Senator Ball of Minnesota to remark:

"Apparently the Army method is to issue a directive first and then consult experts on how to carry it out."

Chairman Truman remarked on several occasions during the hearing that his chief interest was in learning how much or how little technical information the Army had before ordering Canol constructed, and who suggested the idea and urged its adoption.

Evidence indicates that the initiative for Canol came entirely from Lt. Gen. Brehon Somervell, chief of the Army Service Forces. General Somervell signed the Canol directive April 29, 1942, the same day he received a 1-page memorandum on it from Graham. Graham, according to his testimony, had consulted no one but Dr. Vilhjalmur Stefansson, the Arctic explorer, and Frederick A. Delano, uncle of President Roosevelt and chairman of the National Resources Planning Board. Graham believed that a local supply of oil would be valuable to trucks and airplanes in the defense of Alaska, and recommended that the Norman Wells field be developed, a refinery moved from the United States to White Horse, and a pipe line be constructed to connect the two. White Horse was selected because it was about midway of the Alaska Highway and was connected to Skagway by rail. He gave no consideration to development of oil in Alaska nor location of the refinery in U. S. territory.

The Truman committee hearings brought out many features of Canol reflecting unfavorably on the Army.

Imperial Oil doubted that 3,000 bbl. per day could be developed, doubted that the yield of aviation gasoline would be high without shipping in large quantities of components, and suggested that flying the crude out in tanker planes would be more practical than building a pipe line.

The pour point and paraffin percipitate temperature of Norman Wells crude is considerably above prevailing winter temperatures in the area, but the Army figured the oil could be pumped through a 4-in. line.

Construction Behind Schedule

Original completion date was estimated at the fall of 1942, but the pipe line will not be completed until the spring of 1944 and the refinery not until some time later.

To get drilling and pipe-line equipment to Norman Wells the Army had to build a barge route with over-land portages via Great Slave Lake and the MacKenzie River at high cost and along a route it had previously rejected as the site for the Alaska Highway.

The first plan called for obtaining a Houdry cracking plant in California which would yield about 1,500 bbl. of aviation base stock on a throughput of 3,000 bbl. of crude per day, but because this interfered with the U. S. 100-octane program it obtained a thermal cracking plant in Texas which will yield only 479 bbl. per day of aviation base stock.

This refinery was designed for a hot climate and many adjustments are required to construct and operate it in winter temperatures prevailing at White Horse. Winter operating conditions and supply of steam for the refinery were not foreseen when the plans were made.

To get the refinery equipment over the 110-mile narrow-gage railroad from Skagway it was necessary to widen and straighten the right-of-way and reconstruct sections of the railway at considerable cost.

Canol was planned because the Army feared the Navy would not be able to protect tanker shipments to Alaska via the Inside Passage, but the shipping tonnage already used in moving refinery and other equipment for Canol up this same route would have carried as much oil as Canol will produce in many months, and after it is in operation Canol will supply only a fraction of the oil requirements and the balance will have to move by water.

The Army is to pay $1.25 per barrel for oil at Norman Wells until it has purchased 1,500,000 bbl. and then the price will be cut to 75 cents until the Army has recovered its costs, but at 3,000 bbl. per day (the pipe-line capacity) the war would have to last another 25 years to liquidate the Canol investment.

Six months after the war the entire project reverts to Canada without cost to it. Imperial Oil gets the wells and their subsurface equipment. All above-ground structures will be offered for sale at the then commercial value.

Many other critical bits of information about Canol were brought out during the hearings, but Undersecretary Patterson took the position that the project has been approved by the joint chiefs of staff, and that this should place it beyond criticism. However, committee investigators contend that this approval was not obtained until October, 1943, at a meeting the morning before War Department officials were first called to testify at private sessions of the subcommittee, and they expressed doubt that the joint chiefs of staff had all the facts before them when they gave their approval.

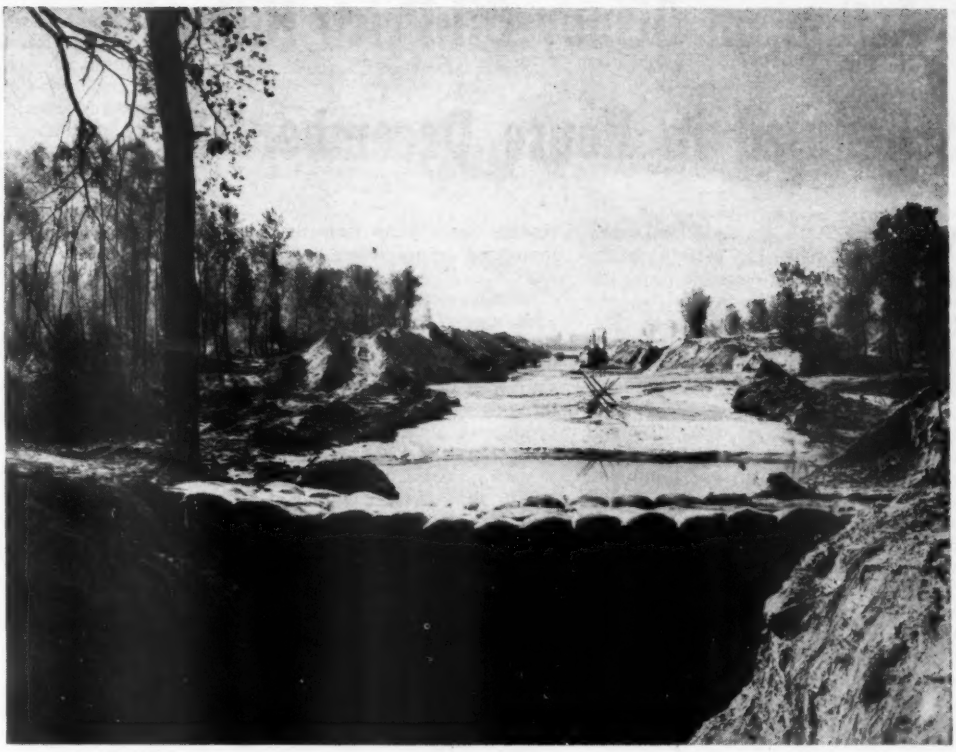
Employes Federation Wins Over C.I.O. at Baytown

BAYTOWN, Tex.—The C.I.O. organizing campaign in Gulf Coast oil industries suffered a setback last week, when the Baytown Employes Federation, independent union, won by almost a 2 to 1 vote over the International Oil Workers Union (C.I.O.) in a National Labor Board election. The federation holds a contract as the bargaining agent with Humble Oil & Refining Co., and the election means this relationship will continue. Similar elections are to be held by 11 other oil-company groups.

Dr. Edwin A. Elliott, regional director of the NLRB, reported that 84.4 per cent of the eligible voters at the Baytown plant cast ballots. The plant has a payroll of 5,400 employes.

Canada Increases Tar-Sand Appropriation

TORONTO, Ont.—The Dominion Government has appropriated an additional sum of $350,000 to prosecute development of the McMurray tar sands, supplementing a previous fund of $500,000. The power plant and the separator unit, the latter being an enlargement of the experimental plant formerly operated by Abasand Oils, Ltd., will be completed and placed in operation in December.



Beneath this surface confusion of construction rests the 24-in. and 20-in. crude-oil and products lines of the War Emergency Pipelines, Inc. From the Arkansas River, in the extreme background beyond the dredge, a 2,000-ft. canal-like ditch has been dug, permitting laying of the lines below the riverbed level to insure their safety if the river should cut into the bank during a future flood

THIS WEEK

PRODUCTION—Ickes takes cue from PIWC, warns that manpower shortage may prevent industry from discharging production obligations. . . . ¶Ralph W. Gallagher, Standard Oil Co. (New Jersey) president, optimistic about Venezuela's ability to produce 1,000,000 bbl. daily. . . . Sees bright future for other South American producing countries. . . . ¶British issue formal statement disclaiming deliberate effort to conserve Middle East oil supplies, argue Mediterranean shipping conditions prevented different action. . . . ¶Current production trend indicates total output will exceed 1,500,000,000 for year. . . .

REFINING—Cooperative wholesale associations increase total processing capacity to 51,000 bbl. daily. . . . Latest plant acquisition by Cooperative Refining Association is National Refining Co. refinery at Coffeyville, Kans. . . . ¶Navy Department repeats plea for prompt completion of aviation-gasoline units, calls for 22 additional plants in 1944, excluding the 40 scheduled for completion in next 3 months. . . . ¶WPB indicates that previously withheld information on war production will be released in near future. . . . Industry's hopes aroused for first composite aviation-gasoline report. . . .

TRANSPORTATION—Tank-car shipments from Norris City, Ill., to East Coast discontinued. . . . Eastern leg of WEP crude-oil line nearing maximum operation. . . . Only few miles of 20-in. remain to be laid to complete products line. . . . ¶George A. Wilson appointed PAW director of transportation, succeeding J. R. Parten. . . . ¶Question of freight compensation for tank-car shipments of sour oil from West Texas to Middle West still debated. . . . Unconfirmed report says Defense Supplies Corp. is balking at paying freight charges to companies in excess-profit bracket. . . . Interior refiners unwilling to absorb average of 13 cents above regular pipe-line tariff. . . .

PRICES—Disney crude-oil price bill scheduled for first House floor consideration December 13. . . . Steering committee discussing most desirable strategy. . . . Action may be postponed until after holidays, if sympathetic congressmen cannot be held in Washington. . . . ¶Chicago tank-wagon distributors advance No. 5 and No. 6 fuel-oil quotations 0.28 cent per gallon. . . . Other product markets steady, gasoline scarce in all areas. . . .

ADMINISTRATION—Truman committee may recommend dropping Canol project. . . . Full and critical report scheduled within 3 weeks. . . . Public hearings on Canadian project terminated without developing favorable testimony for Army administration. . . . Consolidation of two PAW divisions scheduled this week. . . .

Action on Disney Oil-Price Bill Scheduled in House December 13

WASHINGTON, D. C.—The Disney bill to increase the ceiling on the price of crude petroleum is expected to be brought up for action on the floor of the House on December 13.

The necessary 218 members (a majority of the House) have signed the petition to discharge the committee on banking and currency from further consideration of the bill, and House rules provide that such a petition may be called up for a vote on the second or fourth Monday of any calendar month. If a majority of the members present vote to discharge the committee, the bill itself may be called up immediately for debate and a vote on passage. If for any reason the bill is not called up December 13 it will not be possible to bring it up until after the Christmas recess. If adopted by the House the bill must go to the Senate, where considerable delay may be expected.

Parity Price at Issue

The bill (H.R. 2887), introduced by Rep. Wesley Disney of Oklahoma, transfers jurisdiction over petroleum prices from the Office of Price Administration to the Petroleum Administration for War, and provides that the petroleum price schedule shall not be less than "parity" with the index of all commodities published by the Bureau of Labor Statistics.

"This," reported Russell B. Brown, general counsel of the Independent Petroleum Association of America, in his periodical letter to Ralph T. Zook, president, "is an interesting application of democratic principles. Individually and by committees, the House of Representatives had reviewed the petroleum supply situation many times, and numerous recommendations had been made that price increases were required to stimulate the kind and scope of field activity which the entire national interest, including the war effort, demanded. It having become apparent that no action was to be expected from the executive department and that there was no apparent disposition on the part of the banking and currency committee to act on the bill, the House has now called out the bill to be dealt with directly.

"As completed, the petition reflects the determination of a majority of the House members to correct the deficiency in supply which the nation now endures with impatience. It represents more than two-thirds of the members actually present in recent days.

"Seventy-one of the representatives who signed are from states which produce either no petroleum at all or, as in the cases of Tennessee, Missouri and Utah, amounts so small that they may almost be classed as non-producing states. In others, such as New York and Ohio, it is the consumer rather than the producer interest that is predominant," Brown said.

Jordan Appointed to Oil Compact Committee

LLOYD L. JORDAN

Lloyd L. Jordan has been appointed the Arkansas member representative on the Research and Coordinating Committee of the Interstate Oil Compact Commission by Gov. Andrew Schoeppel, chairman, to fill the vacancy caused by the resignation of Alec M. Crowell, director of production, Arkansas Oil and Gas Commission. Mr. Crowell retains his membership on the Engineering Committee.

After graduating from Ouachita College at Arkadephia, Ark., he entered the employ of Sinclair Prairie Oil Co., natural gas and gasoline division. In 1933 he joined the engineering staff of the Lion Oil Refining Co., El Dorado, Ark. Early in 1939, Mr. Jordan joined the staff of the Arkansas Oil and Gas Commission as natural gas engineer and was promoted to the position of division engineer with headquarters in Magnolia in 1942.

Gallagher Predicts Big Gain In South American Output

NEW YORK.—South America, particularly Venezuela and Colombia, "holds the greatest future for expansion of the world's oil production capacity," according to Ralph W. Gallagher, president of Standard Oil Co. (New Jersey), who recently returned from an inspection trip to Venezuela.

Mr. Gallagher predicted that crude-oil production in Venezuela soon would reach 1,000,000 bbl. daily, nearly double the present daily output. He also forecast location and development of vast new oil fields in the interior of Colombia after the war, possibly along the upper reaches of the Magdalena River.

Mr. Gallagher said he plans a trip to Colombia within a few months to inspect oil fields and potential production facilities.

Passenger Cars in Service Now Total 24,406,000 Vehicles

DETROIT, Mich.—Vigor of the automotive economy, declares the 1943 edition of Automobile Facts and Figures, is demonstrated by annual registration figures, showing 24,406,000 passenger cars and 4,267,000 motor trucks still being operated despite wartime restrictions. The booklet containing these data on registrations was issued last week. It is the yearbook of the Automobile Manufacturers Association.

Evidence as to the necessity use of passenger cars is gained from a survey of employes in 94 war plants which showed that 73 per cent of them drove to work. About 85 per cent of the mileage chalked up by war workers is necessity driving, with more than half of it being expended in going to and from work.

Figures on motor-truck use point out that 34 of the largest cities in the nation, including Atlanta, Cleveland, Detroit, Minneapolis, St. Louis and Washington, D. C., received all their milk by motor truck. Some 56 per cent of all livestock receipts at stockyards are attributed to truck transport. Minnesota, South Dakota and Missouri counties showed that small business firms ship nearly half their freight over the highways in motor trucks.

Special taxes levied on motor trucks averaged $117 a vehicle last year, providing more than ½ billion dollars in revenue. Special taxes on buses totaled $808 per bus in 1942, according to Automobile Facts and Figures. Taxes on motor vehicles contributed $2,034,000,000 to state, federal and local revenues in 1942.

Forty Tankers Delivered by Shipyards in October

WASHINGTON, D. C. — The nation's shipyards in October delivered 163 cargo vessels aggregating 1,675,311 deadweight tons, of which 16 were standard tankers, 19 were emergency tankers (modified Liberty ships), 3 were T-1 or coastal tankers, and 2 were private coastal tankers.

World's Largest Butadiene Plant to Start Production Operations in Few Weeks

PORT NECHES, Tex.—Enough butadiene to produce one-seventh of the entire wartime program of synthetic rubber in the United States will be turned out in a single plant operated by the oil industry when the largest plant in the world producing butadiene from petroleum is completed here early in 1944. The first of two units, now almost completed, will be placed in operation in December and the second will be ready shortly thereafter.

To carry out this program five oil companies, with the approval of the Government, organized the Neches Butane Products Co. to supervise design of the plant, and to manage its operation.

Two representatives from each of the five oil companies were named directors. Herbert Henderson, vice president of Gulf Oil Corp., was made chairman of the board, and W. H. Hoffman was made available by Texas Co. to serve as president.

Directors of Neches Butane Products Co., representing the five participants, are: E. J. Henry, vice president, and W. F. Stroud, Atlantic Refining Co.; W. A. Slater and Henderson, vice presidents, Gulf Oil Corp.; C. B. Watson, vice president, and J. P. Langfitt, assistant to the vice president, Pure Oil Co.; W. F. Burt, a director and Dr. J. B. Rather, director of research, Socony-Vacuum Oil Co., Inc., and M. Halpern, vice president and G. R. Bryant, general manager of the refining department, Texas Co.

The Defense Plant Corp., a unit of the Reconstruction Finance Corp. awarded a contract for construction of the plant to the Lummus Co. Neches Butane Products is agent for Rubber Reserve Co., the government agency which finances and is responsible for the production of rubber and the required raw materials.

In normal operation of their Gulf Coast refineries each of the five participating companies produces butane-butylene, which serves as the raw stock for manufacturing butadiene. This raw stock is piped from the refineries direct to the butadiene plant at Port Neches, and to assure a constant supply it is stored in spherical-shaped pressure tanks.

The raw stock actually is a mixture of normal butane and isobutane, and normal butylene and isobutylene, although the gas is commonly called butane-butylene. The normal butylene must be isolated in a highly pure state. This is difficult to do since these materials all boil at nearly the same temperature. Vigorous fractionation is necessary, and then the product must be treated with acid and solvents before the pure normal butylene is obtained.

Dehydrogenation Phase

The second step is carried out in a dehydrogenation plant, and this is the most difficult and unusual operation in the entire process.

The work to be done in this revolutionary operation is to slice off some of the hydrogen units of the pure butylene. If these can be sliced off just right, butylene can be converted into butadiene. Catalysts and extremely hot steam are needed for part of this job. This objective is to knock off two hydrogen atoms of the butylene molecule.

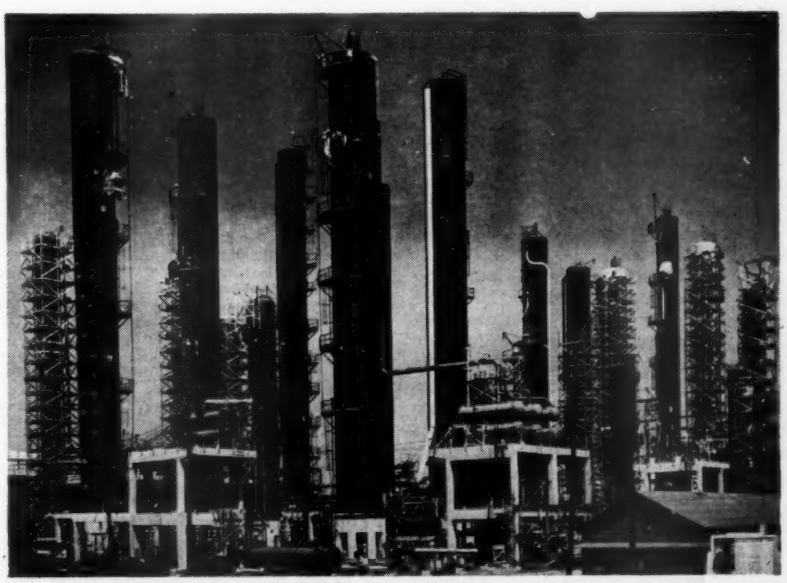
The work of dehydrogenation is so difficult that only 20 per cent of the butylene is converted to butadiene while passing through this network of dehydrogenation equipment. The remaining 80 per cent is rerun and slowly but surely converted.

Superheated steam is needed in this new dehydrogenation process. Steam never had been used at this temperature by this method in industry before, and so a plant had to be developed for this purpose. It is done by using a battery of superheaters in which steam from the central steam plant is reheated.

This intensely hot steam is mixed with the butylene before it is routed through 12 dehydrogenation reactors. As the steam is then mixed with the butylene gas, it must be removed before the manufacturing process can be continued.

After the steam-removal operation, the gas, now containing some butadiene, is cooled and compressed. Six 2,000-hp. compressors, enough to power 120 automobiles, are used. At this stage the product contains about 20 per cent butadiene and 80 per cent butylene. These two are separated in a series of complex treatments in another battery of towers which comprise the third, or purification step. The freed butylene goes back for recycle through the dehydrogenation plant. The final butadiene will be above 98.5 per cent pure, a degree of purity required for the production of synthetic rubber.

About one-third of the raw material received at the plant is converted into butadiene. The remaining two-thirds is returned to the oil refineries for use as charging stock in the manufacture of 100-octane gasoline.



These towers, as high as a 17-story building, are part of the world's largest butadiene plant at Port Neches, Tex., which will start operation early next year

Rocky Mountain Producers Expand Field-Pressuring Operations

by Neil Williams

SPECIAL consideration is being given currently by Rocky Mountain operators to more widespread application of gas-pressuring practices as a means of increasing oil recoveries and making available additional supplies of crude from this district. In this, particular emphasis also is being placed upon the need for returning to producing horizons of all available gas to provide a major reserve of light hydrocarbons which may be needed in the future for manufacture of aviation gasoline and other valuable products.

With a view toward extending gas-pressuring practices, a study of all fields in the district in which such operations are not being carried on is being undertaken by the district's production committee on secondary recovery to determine the fields in which pressure maintenance or repressuring projects might be feasible. In fields in which conditions are adaptable, efforts will be made to encourage the start of pressuring operations.

Gas stimulation in some form has been employed in the production of oil at many Rocky Mountain fields for several years. Principal applications have been in the shallow sand, light-oil producing fields, mostly in Wyoming. Approximately 90 per cent of the light-oil production, representing more than half the total output of that state, is from fields in which gas is being returned to the producing formations.

Since a large part of the light-oil production is from a relatively few fields, principally Salt Creek, Lance Creek and Wertz, numerous pools remain to be considered for possible application of pressure - maintenance or repressuring operations. So far, few attempts have been made to return gas to heavy-oil producing horizons in any of the fields. In most instances free gas production from the heavy-oil horizons has been relatively small, and fairly active water drives have been present. Consequently, these horizons have not provided much incentive or occasion for gas pressuring.

Nine fields, eight in Wyoming and one in Montana, now have projects involving return of gas to producing horizons. The Montana project is a small experimental operation in the Sunburst field, Toole County. In these operations a total of approximately 38,200,000 cu. ft. of gas is currently processed.

This is the fourth of a series of operating articles on Rocky Mountain fields. Pressure maintenance and repressuring projects are being expanded regularly. Another in this series will appear in the December 9 issue, featuring drilling practices and outlining some of the hazards.

Largest of these operations is at Salt Creek, Natrona County, Wyoming, where approximately 20,000,000 cu. ft. of gas daily are being injected into two producing horizons. Started in 1926 at a time when production and pressures had been greatly depleted, this operation has been successful in retarding further pressure declines and prolonging the productive life of the sands. Affected by the project are approximately 12,500 bbl. of daily crude-oil production. Altogether, more than 8,925,886,000 cu. ft. of gas have been returned to the formations in this field.

Pressure - maintenance operations have been under way in Lance Creek, Niobrara County, the next largest project, since 1938. More than 15,285,000,000 cu. ft. of gas have been returned to producing formations. Here approximately 20,300 bbl. of daily crude-oil production are involved.

In the Wertz field, Carbon and Sweetwater counties, approximately 4,280,000 cu. ft. of gas are being returned daily to the formation, including all the produced gas plus sufficient makeup gas obtained from shallow gas sands to maintain pressures in the producing horizon. This project, started in July 1941, is one of the newer pressure - maintenance operations in the district. Currently, the field is making about 5,750 bbl. of oil daily.

Cycling and gas-lift operations

(Continued on page 33)

GAS PRESSURING AND PROCESSING PLANTS IN ROCKY MOUNTAIN DISTRICT

Field and county—	Type of plant—	Daily gas capacity (M.c.f.)	Gas returned formation daily (M.c.f.)
Wyoming			
Elk Basin, Park	Pressure maintenance	750	*500
Grass Creek, Hot Springs	Compressor and cycling	2,000	200
Hiawatha, Sweetwater	Absorption	50,000	None†
LaBarge, Lincoln-Sublette	Compressor and cycling	2,000	200
Lance Creek, Niobrara	Pressure maintenance, absorption	15,000	10,000
Lost Soldier, Sweetwater	Pressure maintenance	5,000	(‡)
Rock River, Carbon	Repressuring	3,000	1,600
Salt Creek, Natrona	Repressuring-absorption§	25,000	20,000
Sand Draw, Fremont	Absorption	25,000	†None
Wertz, Carbon-Sweetwater	Pressure maintenance	6,000	4,280
	Total	133,750	36,780
Montana			
Cut Bank, Glacier	Absorption	60,000	None
Sunburst, Toole	Compressor and cycling	300	75
	Total	60,300	75
Colorado			
Fort Collins, Larimer	Compressor and cycling	500	None
	Total	194,550	36,856

*Temporarily shut down.
†Gas processed for liquid recovery. Residue marketed.
‡Plant under construction. Former plant returned 900,000 cu. ft. of gas daily to producing formation.
§Absorption plant under construction.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

"Good Neighbor" in Reverse

OVER the past two decades the American people have gone a long way in the establishment of a good-neighbor policy with other peoples to the south in this hemisphere.

The war emphasized the need for this hemispheric solidarity and the exigencies of a crisis in world affairs have deepened and widened the foundation on which a permanent policy of friendship and trade can be built.

The common defenses of the Western Hemisphere have been strengthened; this country and its nationals have furnished money and materials in the development of natural resources and in the establishing of manufacturing facilities of the Latin-American countries; cultural and social relationships are being fostered. Important in war, all this can be extended with the return of peace.

The Government's oil policy has not served this common purpose of greater cooperation among neighbors. Shortly after our entry into the war the Latin-American countries lost most of their petroleum-export outlets because this country could not defend its shipping.

Now with transportation returning there are developments which are of concern to the leadership of the oil countries which fear that they are to be stripped of their petroleum with no adequate provisions being made for replacements.

In 1941 the crude-oil output of Venezuela, Mexico, Trinidad, Peru and Colombia—the countries with exportable surpluses of petroleum—was 23 per cent of that of this country. At that time the proven reserves of those countries considered as a unit in relation to production, were substantially greater then than they were in this country.

Those responsible for the Allied war program are now preparing to greatly increase the petroleum taken from the principal producing countries located in the northern part of South America and in Mexico. Venezuela's output, alone, is to exceed the production of the five countries previous to Pearl Harbor. Other countries are to expand.

This program was born when Washington tardily realized that this country could not take care of the mounting military and civilian requirements of the Allied nations. Certain of the war-administration officials are hopeful that by drawing on all the resources of this hemisphere for maximum quantities there will be sufficient petroleum for the war with a continuance of prewar prices. They are not concerned with what happens later.

The finding and the production of crude oil in Latin-American countries do not differ essentially from the practices of this country. While the countries to the south have large probable oil areas, their discovery, as in this country, will be more difficult in the future than it has been in the past.

Without an adequate return on the oil now being produced, operators will not be able to make the expenditures required to find new oil, part or all of which is certain to be in remote areas. More materials and trained manpower are also needed. Otherwise our neighbors will be quickly depleted of their oil at a time when they are in need of it to develop their own economies and those of other countries dependent on them for petroleum.

This is a matter that should receive immediate consideration from Congress and from all the civilian and governmental agencies which are endeavoring to establish sound Pan-American relations. Action has already been too long delayed.

Texans Urged to Use Gas Supply In Developing State's Industry

AUSTIN, Tex.—E. P. Schoch, professor of chemical engineering, University of Texas, this week called on Texans to consider the state's natural-gas resources as their greatest means for industrial development. He warned that exports of large volumes of gas may take from the state its greatest means of industrial development and issued a long statement on the potential value of this resource.

"With the recent discoveries of her enormous reserves of natural gas," Schoch said, "Texas attained the position of having the cheapest fuel supply in the world, and this is attracting industry to Texas.

"The picture of 'cheap gas for fuel only' is not attractive, and it will certainly do nothing to lengthen our gas age. But the latter could be brought about by developing new and special uses for gas, which will raise the value of gas. Its higher value would automatically stop waste, make exportation of gas less profitable, and bring back the use of lignite for large-scale power production.

Pure-Hydrocarbon Supply

"Natural gas is not merely a fuel. It is the largest supply of a nearly pure single hydrocarbon that the world has ever presented, and it is likely to become the raw material for manufacturing many different substances, particularly gasoline, rubber, and plastics.

"One of the most promising possibilities for new manufactures from natural gas is the production of acetylene by a new kind of electric discharge. This acetylene can be converted immediately into acet-aldehyde, a volatile liquid, which can be shipped with safety and which is readily convertible to butadiene or to acetic acid. These two compounds are used respectively for rubber and for plastics.

"The total amount of acetylene now used for these purposes in North America is about 100,000 tons, and indications point to a vast increase. If Texas obtained a fair portion of this increase, it could produce at least 100,000 tons of acetylene and by this means build up a vast new industry."

Approval of the Tennessee Gas & Transmission Co. line from Corpus Christi, Tex., to Kenova, W. Va., was cited in the early part of his statement as typical of the exporting trend which he contends is inimical to the interest of Texas.

"It is a striking coincidence," Schoch argued, "that some of the chief plants for making acetylene and plastics are located in West Virginia where the new pipe line will deliver 70,000,000 cu. ft. of gas per annum while the manufacture of 100,000 tons of acetylene would only require 20,000,000,000 cu. ft. But it makes an enormous difference to Texas whether she receives $600,000 for the 20 billion cubic feet of gas shipped out or $250,000,000 for the plastics manufactured therefrom.

"We do not mean to say that the gas sent to West Virginia is to be used for the manufacture of plastics there. To the contrary gas is needed there for other uses such as special metallurgical operations, glass furnaces, etc., for which they now frequently 'requisition' their own gas supplies. And they make acetylene from carbide which is made with water power. It is a mere coincidence that our gas, which we can use more effectively for plastics, is going to this region where plastics are made. It is quite possible that this pipe line is a war necessity, and this 'one more' pipe line may not injure us seriously. But many more such lines certainly will injure us, particularly if we neglect to use our opportunity to build up an industry for which the gas gives us an outstanding advantage."

Continental Revises Producing Organization

PONCA CITY, Okla.—Continental Oil Co. recently announced reorganization of its producing department east of the Rocky Mountains to include four regions with one or two divisions in each, effective last month.

Under the new arrangement there will be the Ponca City region including the Oklahoma and Kansas division and the Illinois-Indiana division, the Fort Worth region including the North Texas-Panhandle division and the West Texas-New Mexico division, the Denver region consisting of the Wyoming-Montana division, and the Houston region consisting of the Louisiana division and the Texas-Gulf Coast division. Regional offices in each case are in the city from which it obtains its name.

Regional operating personnel will be as follows: Ponca City region: L. P. Carpenter, manager; R. B. Sale, assistant to region manager; Charles C. Frye, regional petroleum engineer. Fort Worth region: H. B. Hurley, manager; R. M. Hunter, assistant to manager; M. H. Dubrow, regional petroleum engineer. Denver region: J. C. Johnston, manager. Houston region: O. L. Fisher, manager; C. B. Hackernell, assistant, and James P. Malott, regional petroleum engineer.

Headquarters of the Oklahoma-Kansas division will be at Ponca City with E. C. Wilbur division superintendent; the Illinois-Indiana division will headquarter at Evansville, Ind., with C. R. Allen division superintendent; West Texas-New Mexico division headquarters at Midland, Tex., with H. L. Johnston, division superintendent; North Texas-Panhandle division headquarters at Wichita Falls, Tex., with G. F. Beekman division superintendent; Wyoming-Montana division headquarters as Casper, Wyo., with Ira D. Pierson division superintendent; Louisiana division headquarters at Basile, La., with W. J. Lueck division superintendent, and Texas Gulf Coast division headquarters at Corpus Christi with J. M. Clark division superintendent.

House Bill Provides For More Petroleum Attaches

WASHINGTON, D. C. — Appointment of additional petroleum attaches and oil control officers by the State Department is provided in an appropriation passed by the House and now pending in the Senate.

General expansion of the department's foreign-service personnel is provided by the appropriation, and funds are carried to employ two additional petroleum attaches at $6,000 per year, one each for Central American countries and for Mexico; and for nine oil control officers at $4,600 each to be stationed in Spain and Portugal. Several other petroleum attaches may be appointed by the department in various countries under appropriations made available last summer.

Deadline on A.C.S. Papers Set Ahead to January 20

Because of the delays in clearing copies with censors prior to preprinting, all papers for presentation before the Petroleum Division, American Chemical Society, at its April 1944 meeting must be in the hands of the division secretary by next January 20, it was announced this week by C. R. Wagner, secretary.

Three copies of each paper, or three copies of a 1,000-word abstract of it, and three copies of a 100-word abstract must be in the division secretary's hands by January 20. In any case three copies of the finished paper must be in his hands, Utica, Ohio, by January 31, he points out.

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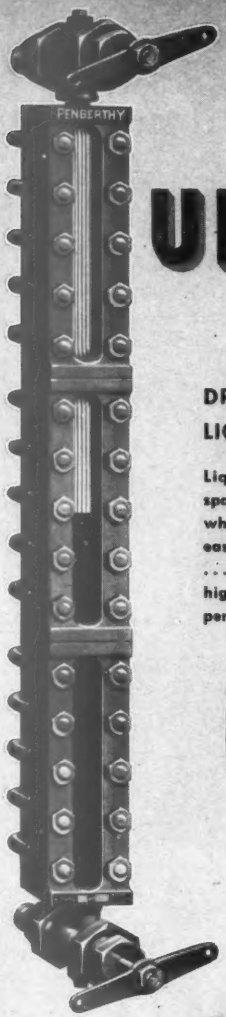

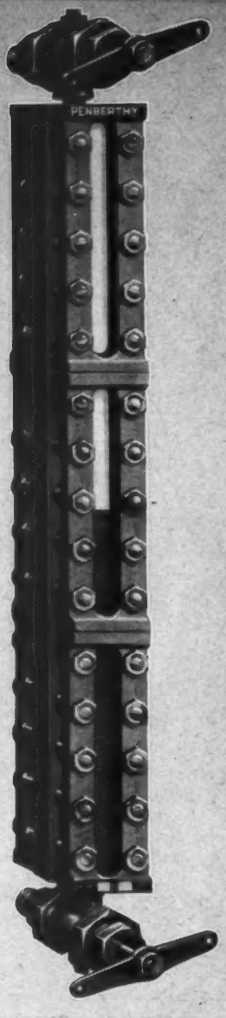

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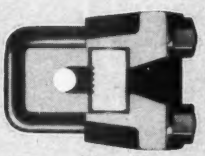

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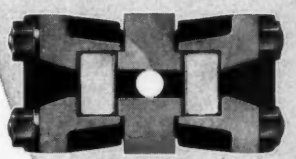

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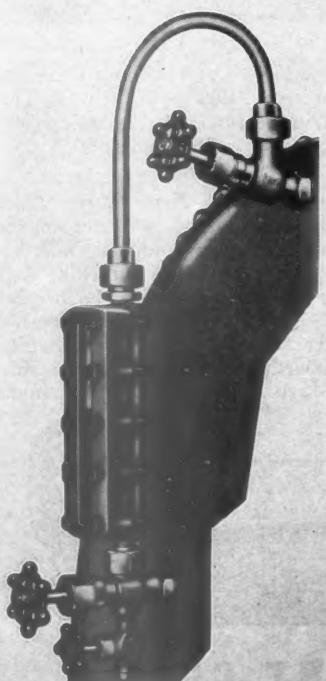

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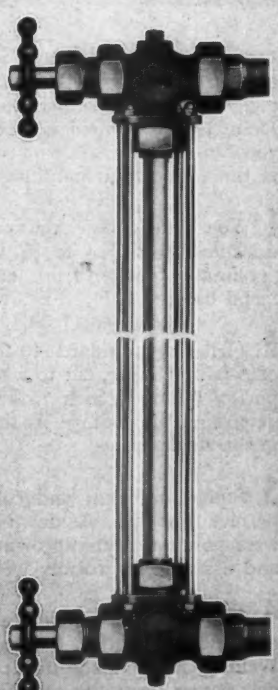

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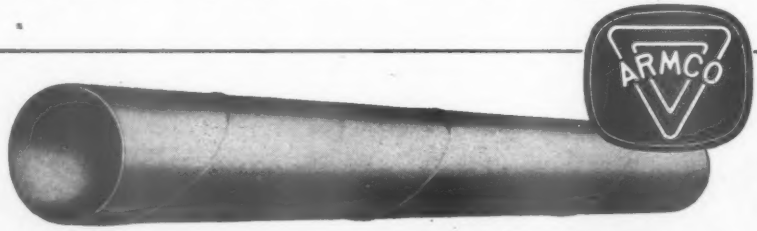

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Rocky Mountain Fields Are Being Repressured

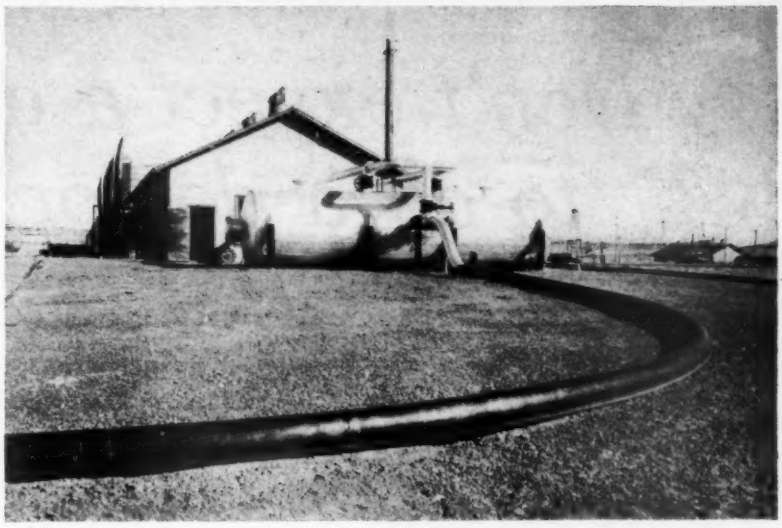
(Continued from page 28)

which have been carried on in the Lost Soldier field, about 3 miles west of the Wertz field, in Sweetwater County, since 1926, recently have been suspended, but will be replaced by a much larger pressure-maintenance and repressuring project. Construction of the new plant is now under way, and it is expected to be in operation early next year. This field, one of the more important light-oil pools of the district, now is pumping approximately 4,300 bbl. daily.

One of the more interesting operations is that at Rock River, Carbon County, where the producing formation is being repressured with surplus gas piped from the Medicine Bow field, approximately 6 miles distant. Before repressuring was started in 1930, gas in this field had been entirely depleted and crude-oil production had dropped to 1,400 bbl. daily. Since, pressures have been built up to more than 400 lb. and daily oil production increased to 2,750 bbl.

Small-scale gas pressure or cycling projects have been carried on in the Elk Basin field, Park County; Grass Creek field, Hot Springs County, and La Barge field, Lincoln and Sublette counties. From 200,000 to 500,000 cu. ft. of gas have been injected daily into shallow sands in each of these fields principally for stimulating production. Within recent weeks, the compressor plant at Elk Basin, which has been operating more than 10 years, has been shut down for repairs.

Construction of additional facilities to increase the recovery of liquid products from the gas processed is now under way in two fields. At Salt Creek, a complete new absorption plant is being erected. This will replace a hot column, on which previous operations have depended for recovery of liquids extracted in compression. At Lance Creek, major additions are being made to the present absorption plant. Both projects will provide for recovery of butanes and other liquefied petroleum gases.



Repressuring booster compressor plant at Salt Creek

New Gasoline Said to Meet Wide Range of Temperature

WASHINGTON, D. C. — An all-weather, all-purpose gasoline which can be used in temperatures ranging from zero to extreme heat has been developed by the U. S. Army after 3 years of experimentation, it is announced. The new fuel, standardized at 80 octane, will eliminate the necessity for differentiating between winter and summer grades, the announcement states. Operations in temperatures of extreme cold will call for somewhat different specifications.

"Vapor lock is eliminated at high atmospheric temperatures, and good starting, with short warmup periods, is provided at low temperatures," the War Department announced.

Working for 3 years with the Ordnance Department and the oil and automobile industries, the gasoline was developed by the Fuel and Lubricants Division, Office of the Quartermaster General, Army Service Forces.

High-Octane Gasoline Plant May Be Built in Mexico

MEXICO CITY. — Eugene Houdry, inventor of a process for producing high-octane gasoline, is considering construction of a high-octane plant in Mexico, according to a report current here. Need for such a plant is said to have been studied by officials of the United States, and a list of necessary priorities would be sent to Washington, D. C., for approval.

OPA to Issue Breakdown of Revised Oil-Price Schedule

WASHINGTON, D. C.—The Office of Price Administration is soon to issue separate price regulations governing lubricants, gasoline, and fuel oil, completing the breakdown of the Revised Schedule 88, which previously controlled all oil prices.

Schedule 88 and its 140 amendments are divided into three regulations, the first being the crude price order issued some time ago. Gasoline and fuel oil will be placed under the same new regulations, since these products are sold under similar conditions, OPA officials said. There will be no major changes.

The lubricants order will be divided into two sections determined by the price freeze date. For motor and stock oils this is October 1941, while greases, industrial oils and miscellaneous products will be in the other section due to their March 1942 freeze.

Foreign Operations Are Consolidated by Texas Co.

NEW YORK.—Consolidation of its export sales and foreign producing departments into a new unit, "Foreign Operations," is announced by Texas Co. C. E. Olmstead, vice president, will be in charge of the unit, designed to handle postwar developments in oversea operations.

An executive division is set up with W. F. Moore, former manager of the purchasing department, and W. H. Borie, former general manager of the export sales department, as assistants to the vice president.

Harris T. Dodge, former assistant general manager of the export sales department, has been made general manager of foreign sales. F. C. Sealey retains his post as manager of foreign production.

Humble Claims Reward for Its Florida Oil Discovery

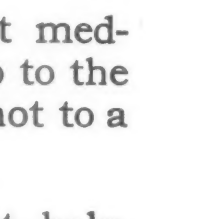
TALLAHASSEE, Fla.—Humble Oil & Refining Co., which recently struck oil in Collier County, has claimed the reward of $50,000 and oil leases on 40,000 acres of land offered by the state for the first discovery of oil in commercial quantity. Humble offered to divide the cash between the University of Florida and the Florida State College for Women for scholarship funds. The offer is predicated on further tests to determine whether oil in commercial quantities prescribed by the law is present in the well.

Don't expect a druggist to do a doctor's job

When you need expert medical advice it is wise to go to the best doctor you know — not to a drug-store

When you need expert help, first to study, then to solve your refinery problems, it is wise to go to the leading specialist in *that* field

The druggist does an important service for the patient when he fills the doctor's prescription The contractor performs an important and necessary service for the refiner when he builds to the designs and specifications developed by refining specialists of widest experience and skill — those of U. O. P.



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Suppressed Industrial Data To Be Released

WASHINGTON, D. C.—Release of a large amount of past and current industrial statistical data restricted for nearly 2 years for confidential use of war agencies will be made available soon to American business, it was announced here last week by Donald M. Nelson, chairman of the War Production Board.

The new policy, Nelson said, will help to correct some inconsistencies. He cited the anomaly of a manufacturer of blankets, heating stoves or valves being unable to learn the total production of his industry, yet frequently reading how many guns, rounds of ammunition, planes and ships were produced last month or year. The Oil and Gas Journal has pointed out repeatedly a similar anomaly in restrictions on the volume of aviation gasoline currently produced and projected while WPB and other agencies were permitted to discuss the production of war planes, the percentages of losses and the number operating in various combat zones.

The statistical material will be based on reports and studies originating in operations of the WPB, information collected and tabulated by the Bureau of the Census for WPB, minerals production figures assembled in cooperation with the Bureau of Mines, and data from additional sources.

First releases will be issued in a few days, and in so far as dependable facts are available, will cover the period from the beginning of the wartime restrictions on information to the present. Frequent reports will then be made until most of the major lines of industry have been reported. After business and the country have thus been brought up to date, subsequent releases will be issued monthly or quarterly for each line of industry or each product.

The data will be channeled through key groups representing American business and industry; namely, trade magazines, trade associations, the Department of Commerce, the U. S. Chamber of Commerce and the Committee on Economic Development.

First Horizontal Well Showing for Producer

FRANKLIN, Pa.—Blown in on Thanksgiving Day with more than 1,200 lb. of explosives, the country's first horizontal-shafted oil well is reported to be a producer. How much of a producer is not yet certain. The well, a pioneering project of the Venango Development Corp. about 2 miles north of Franklin, is 20 miles south of the Drake well, which touched off the American petroleum industry 84 years ago.

Leo Ranney, who developed the horizontal-well drilling technique, said the string of explosives—about 3,800 ft. from end to end—was the longest ever set off. He hoped to drain from the Venango first sand the oil that would be produced by 200 ordinary vertically drilled wells.

Eight-foot lengths of 80 per cent high-velocity gelatin and a ¼-in. line of TNT were packed into the two 2,350-ft. long horizontal "wells" to within 400 ft. of the underground work chamber, 429 ft. below the surface.

A shaft 8 ft. in diameter drops down to the work chamber. Ranney estimated the blast created pressure of more than 1,000,000 lb. per sq. in.

Expressing confidence the well would prove a success, Ranney reported that about an hour after the shot the shaft car was lowered and came back with signs indicating there were about 1,000 bbl. of fluid in the work chamber.

He said he could not determine what percentage of the fluid was oil, but that it could be heard boiling and bubbling down the shaft. He said it would take several days to clear the shaft and definitely determine the result of the shot.

The project was started in July, 1942, with the sinking of the vertical shaft.

DEATHS

Sam Longfellow, 77, superintendent and principal stockholder of Ohio-Osage Oil Co., died November 29 in Hominy, Okla., where he resided. He entered the oil business in Hominy in 1909 and was active in it to the time of his death.

O. F. Hilliard, 60, died last Friday at Carmel, Ill., of burns suffered a short time before when an oil-treater engine he was operating exploded.

A. W. Hudson, 83, retired oil operator, died last week in Jennings, La.

James N. Oxford, 48, stillman for Mid-Continent Petroleum Corp. and employed by that company for 20 years, died last week at his home in Tulsa.

Edward F. Vann, 53, tax accountant for Oklahoma Natural Gas Co., Tulsa, died November 17 as he was being admitted to the Veterans' Hospital in Muskogee, Okla. He had been in the service of Oklahoma Natural 25 years. He was stricken with a heart ailment shortly before his death.

Harry C. Merritt, 62, former vice president and general manager of the Allis-Chalmers Manufacturing Co. tractor division in Milwaukee, Wis., died November 17 of a heart attack at his farm home near Littleton, Ill.

John Mong, a pumper for Continental Refining Co., by which he had been employed 26 years, died while being taken to an Oil City, Pa., hospital

Gustave L. Backstrom, 65, secretary-treasurer of Nourse Oil Co., died at his home in Kansas City, Mo., last Saturday.

Neville B. Graham, 37, for several years civil engineer for Brown & Root Co., Houston, Tex., died last Thursday in a Houston hospital.

Thomas Riley, 38, and **Philip Sullivan,** 39, employes of Socony-Vacuum Oil Co., Inc., in its Brooklyn, N. Y., refinery, died last week from injuries suffered a few hours before in an accident at the plant when an exchange feeder pipe exploded.

Leslie Roth Harrison, 29, civil engineer for Magnet Cove Barium Corp., Houston, Tex., was killed last month in the crash of a naval plane near Rio de Janeiro, Brazil, which cost the lives of 18 persons.

Henry D. Landers, 59, production superintendent for Valley Osage Oil Co. since 1925, died last week at his home in Tulsa.

Robert E. Kendall, 67, retired industrial chemist of Hillsdale, N. Y., died last week in Poughkeepsie, N. Y. Kendall formerly was associated with Tide Water Associated Oil Co. and E. I. du Pont de Nemours & Co.

James Harve West, 73, veteran Texas oil operator, died last week in Stamford, Tex. Interment was in San Diego, Calif.

Maj. James A. Fawcett, 82 pioneer oil man and a former mayor of Oil City, Pa., died in that city Thanksgiving day. Major Fawcett was born in Liverpool, England. He graduated from Brooks Military Academy in Cleveland, Ohio, and in the first World War was commissioned a major. He had resided in Oil City since 1890, when he assumed the management of Crystal Oil Works, of which he eventually became sole owner. He was a director of the old Pure Oil Co. of New Jersey before it was acquired by Ohio Cities Gas Co., served as secretary of the Oil City and Titusville Refiners' Association and was a member of the National Petroleum Association.

William E. Green, auditor for Texas Co. in its New York, Houston, Tex., and Los Angeles, Calif., offices, died last Thursday in Houston, where he resided. For several years he served as foreign auditor in Shanghai, China, and Manila, Philippine Islands.

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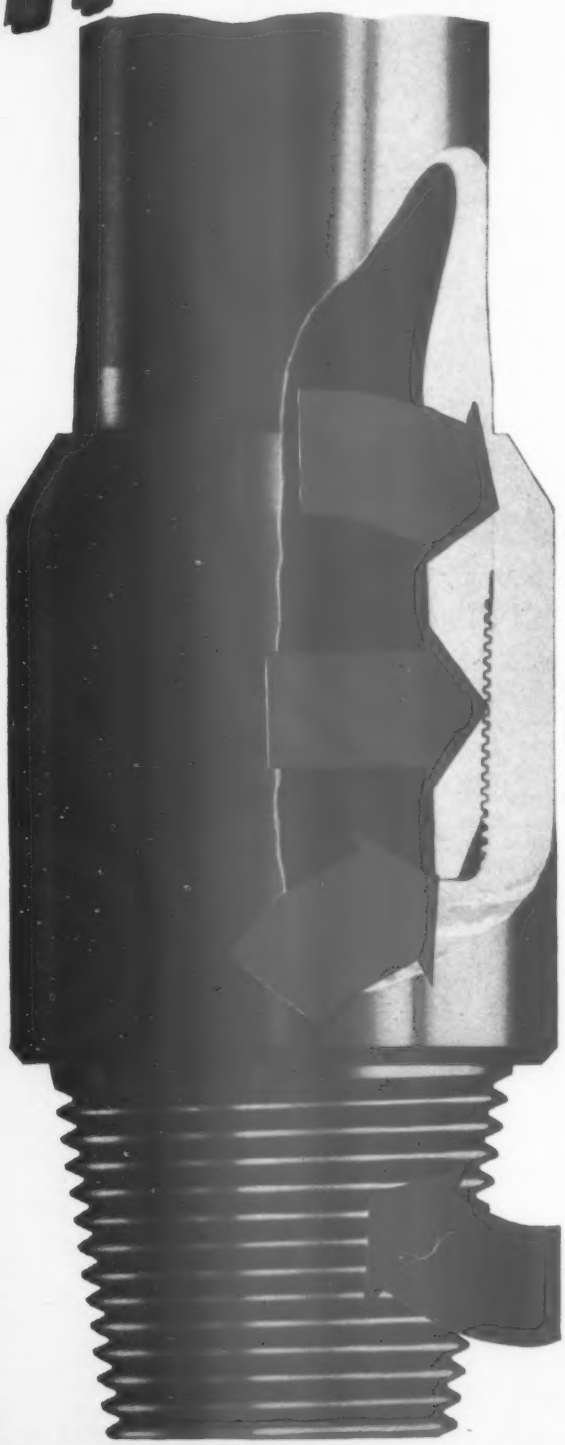

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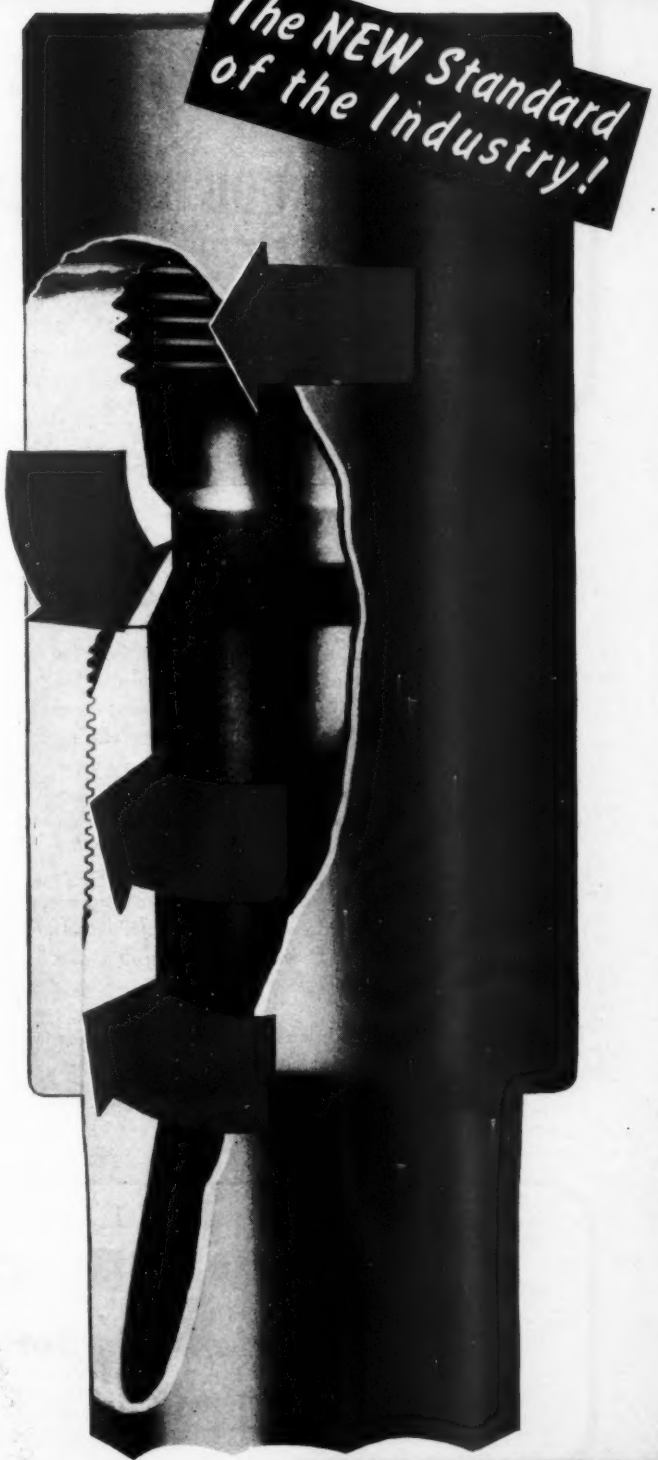

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JOB EVALUATION As Applied To the Petroleum Industry

*by Thomas C. Frick and S. W. Russell**

Job analysis is one of the more important parts of industrial relations as it seeks to eliminate inequities in wage scales, both monthly salary and hourly rates. A scientific approach is used in arriving at the relative value of each job. In this article, the authors develop the background on which the plan is based, the objectives and the operation of the system. Specific examples are included. Authors' biographies appeared on page 120, November 25.

JOB evaluation may be defined as a systematic and orderly method for establishing salary ranges and hourly rates for jobs within a corporation or enterprise. It is not a scientific method of establishing wage rates, but does use a scientific approach in arriving at relative value of jobs. In any economic system, it might be possible to work backwards to determine what should have been allocated to capital and what should have been allocated to labor 5 or 10 years ago to keep the system in proper balance. But, labor must be paid currently and cannot wait 5 or 10 years until all of the facts of the case are in to determine what they shall receive.

The problem of paying wages on a scientific basis is complicated as stated by economists. Wages are paid to labor because labor adds value to a product, but land and capital also add value to a product. Then in any enterprise rent is paid for the use of land, interest is paid for the use of capital, and wages are paid for the use of labor. To attract a plentiful supply of land, labor, and capital, each must be rewarded according to ability to add value to a product. Land, labor, and capital compete with each other in a system of free enterprise, and there is competition within each factor as to the type and form being used; that is, skilled labor could be used with hand tools to do a job or semiskilled labor might be able to do the same job with complicated or skilled machines. Therefore, says the economist, the value of land, the value of capital, and the value of labor vary with supply and demand and if the value of each could be determined for any 1 month the value would be different for the next. If it be assumed that the value of labor could be determined currently, still it would be next to impossible to allocate each industry's share for wages within an economic enterprise, each corporation's share within the industry, each individual's share within the corporation of the total value on a current basis.

Because of the lack of a scientific method for computing wages and salaries a practical approach must be made. Fig. 1 represents various factors which enter into the remuneration of all who work for hire, including the lowest-paid workers and top executives. Item A in Fig. 1 has long been recognized by American industry, especially the petroleum industry, before the enactment of the federal wage-hour regulations which now have as a minimum 40 cents per hour for a 40-hour week with time and one-half for overtime. Most employers will continue maintaining this minimum standard of living regardless of federal regulations. Item B is the impersonal factor of the value of a job and might be considered the value of the duties, responsibilities, and working conditions which go to make up any job. Item C is the value of the personal factor of a job and recognizes the fact that efficient individuals add more value to a product by doing a greater volume of work. Item D represents employe remuneration which does not appear in the pay envelope each month. This factor might be called a hidden bonus and is used by a number of oil companies. It appears in items such as: contributions on the part of the company to retirement systems, employe stock ownership, group or individual insurance, sickness benefits, etc. Although not received by the employe from month to month, Item D is a part of employe remuneration.

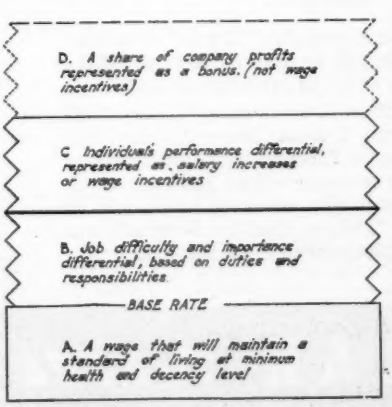
D. A share of company profits represented as a bonus. (not wage incentives)
C Individual's performance differential, represented as salary increases or wage incentives
B. Job difficulty and importance differential, based on duties and responsibilities
BASE RATE
A. A wage that will maintain a standard of living at minimum health and decency level

Fig. 1: The various factors which enter into job remuneration

Job evaluation is more concerned with Items A and B in Fig. 1 which make up the base rate of a job and is more particularly concerned with Item B. As defined by Benge, Burk, and Hay,[1] job evaluation is composed of two parts. (1) Describing all positions and jobs in detail, and (2) arranging all positions into grades or rates in accordance with their relative difficulties, responsibilities, and working conditions. These authors further state that in fixing salaries or wages for an individual there are three points to consider: (1) What are the duties of a job?; (2) what is the value of these duties?, and (3) how well does an employe perform his duties? Job evaluation is concerned with the first two questions and should supply the answer to the questions "What is the job?" and "What is it worth?" The third question will have to be answered by the supervisor and those competent to merit-rate individuals. As its ideal job evaluation should bring about "equal pay for work of equal difficulty and importance," which is a sound company policy and is fair and just from the employe point of view.

Wages and salaries can be paid on a systematic and orderly basis by using factors which can be comprehended and that are capable of being compared and evaluated on a current basis. These factors are used, sometimes unconsciously and without system and order, by every employer when making an employment, transfer, or promotion of an individual. As example, an employer will pay twice or even three times as much to a chief chemist of a refinery as he will to a young chemist just out of college and think nothing about it. The reason is probably that although the educational requirements are the

*Job analyst and assistant job analyst, Atlantic Refining Co., Dallas, Tex.

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For example, Number One represents "Caterpillar's" basic engineering skill and precision workmanship which have given you

(a) *Simplicity of operation.*
(b) *The ability to work in any climate, on any job.*
(c) *The ability to burn a wide variety of fuels.*
(d) *Proved—again and again—dependability.*

Number Two—"Dealer Quality Service"—offers you

(a) *Factory-trained service men.*
(b) *Modern shops.*
(c) *Special tools.*
(d) *Money and metal saving repair methods.*

This particular "TWIN" is vitally essential to you right now. Make it a point to see him regularly!

There is scarcely a "Caterpillar" Diesel Tractor, Motor Grader, Engine or Electric Set—regardless of age or usage—that hasn't a lot of dependable working hours left in it. "Dealer Quality Service" will help you keep it on the job.

REMEMBER

THE FIGHTING FOUR

INSPECT. Look your equipment over frequently. For expert "internal" inspection, call in a trained "Caterpillar" Service Man. Read your Operator's Instruction Book.

LUBRICATE. Use the right oil at the right time in the right place and in the right quantity. Keep it clean and replace before it deteriorates.

ADJUST. Tighten all bolts. Keep valves and clutch in proper adjustment. Read the Operator's Instruction Book.

REPLACE. Have "Dealer Quality Service" recondition or replace worn bearings, cylinder liners, clutch linings and other parts vital to restored power and extended engine life.

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same, the chief chemist makes more use of his education on the job.

Then one factor might be called "mental effort or mental requirements" of a job which considers the amount of formal education normally required to do the job and the amount of use of such formal education. Another difference will be experience required to do the job, that is, knowledge normally acquired by experience, time to acquire such experience, and decisions made by such experience. This might be called the "skill or experience" requirements of a job.

Physical exertion such as standing, walking, lifting, climbing, etc., and special individual physical characteristics might be another factor where differences exist, and in this case it might be in favor of the young chem-

SB-4000-2

HOURLY RATED JOB SPECIFICATION

DATE 3-17-42

PAYROLL TITLE: Lease Pumper — DAY WORKER / CLERICAL — ALTERNATE TITLES — DEPT(S)

DIVISION(S): Lease Pumping Operations Flowing Wells — LOCATION(S): LA. Gulf Coast (Bayou Sale) — APPROVAL

DESCRIPTION OF DUTIES

Under general supervision of Production Engineer; obtains production from flowing wells by operation well flowing devices and using natural reservoir pressure, causing oil to flow into lease tanks; maintains lease equipment, keeps production records and prepares reports.

Receives verbal instructions from superior whom he contacts once or more often each day on the lease. Works alone but under the guidance of supervisor, plans and lays out daily routine of flowing each well on his lease to obtain the allowable (or maximum) production in the most economical manner. Opens valves and/or changes chokes at each well to regulate the flow of oil, and allow the desired quantity of oil to flow into lease tanks. Checks each well once or more often each day to see that well is flowing properly. Gauges lease tank daily and switches tanks as needed; makes "shake-out" to check sediment content of oil as often as is necessary to determine amount of treating required, if any, and to see that oil meets pipe line specifications; witnesses pipe line gauges and signs run tickets as company agent. Keeps supervisor informed of condition of well on each lease and any unusual conditons affecting lease operation. Checks the operation of automatic valves on separators and checks and adjusts valves on bleeder line from lease storage tanks to see that any water in lease storage tanks is properly drained off. Uses mechanics' and pipe fitters' hand tools to make minor repairs and adjustments to separators, oil, gas lines, change chokes in flow lines at well head and other lease mechanical equipment. Reports to supervisor any major repairs needed. Keeps mechanical equipment and area around wells and tank batteries clean and free of rubbish. Walks high pressure gas and oil lines once or more often each day to see that lines have not been damaged, uncovered, leaking, etc. to avoid any possibility of damage to land or to detect hazardous conditions. Checks regulators on high pressure gas lines, checks gas meters and changes charts on meters as required. Occasionally assists supervisor in measuring up casing, check tubing removed from wells and check working time of crews on special jobs. Keeps record of production and other lease activities as follows: Prepares daily production report, monthly well operating report, report of chemicals used, motor operating report, personal automobile mileage report and delivers same to superior for check and approval.

SPECIFICATION NUMBER

PAYROLL TITLE & STD. ABBREV.: Lease Pumper - Flowing LSE. PMPR.

TOTAL POINTS

BASE CLASS

RATES — CONV. ____ - ____

PERSONAL QUALITIES — % — % — % — % — %

MENTAL EFFORT	SKILL	PHYSICAL EFFORT	RESPONSIBILITY	WORKING CONDITIONS
FORMAL EDUCATION OR EQUIV. Grade 8	SKILL REQUIRED TO START ON JOB: Some knowledge of lease operations; how to flow a well, switch tanks, maintain and service well and lease equipment.	ACTIVITY Standing 45%, Walking 40%, Climbing), Operating Valves) 15%	FOR EQUIPMENT Maintaining, Operating - Producing, Tools	PLACE Outdoors 100%
KIND OF SPECIAL EDUCATION None		OPERATION Varied	FOR TOOLS None	SURROUNDINGS Orderly, some dirty and greasy
KIND OF TECHNICAL KNOWLEDGE None	PREVIOUS TIME TO ACQUIRE & WHERE: 6 months as Roustabout, plus 6 months as Starting Lease Pumper.	CONTINUITY Intermittent	FOR MATERIALS Storing - Raw Materials; Guarding, Using - Supplies	ATMOSPHERE Natural Considerable humidity at times
NEAREST MATHEMATICS USED Percentage		REQUIRED REST PERIODS None		TEMPERATURE Natural
READ BLUEPRINTS	ADDITIONAL LEARNING TIME REQ. ON THIS JOB: 1 week to learn lease locations	STARTING AGE LIMITS 21 - 45		ILLUMINATION Natural
ENGLISH Complete	FURTHER TIME REQ. FOR PRACTICE BEFORE NORMAL PROFICIENCY: 1 month to learn flowing characteristics of wells	HEIGHT &/OR WEIGHT None		HAZARDS High pressures, falls from tanks, snakes and insect bites
JOB INSTR. RECD: Job - Oral, self Method - Oral, Routine, Self	PRECISION LIMITS & DECISIONS: Cannot deviate from established routine; makes minor decisions to carry out daily tasks.	SEX & COLOR MR-WR; STRENGTH Normal; EYESIGHT Normal; HEARING Normal; ABNORMAL FATIGUE None	FOR SPECIAL SAFETY PRECAUTIONS: Company rules and regulations	PROMOTIONS Prod. Foreman
JOB INSTR. GIVEN None			FOR SUPERVISION EXERCISED: None	REGULARITY OF INCOME Steady
C GRADE OF INTELLIGENCE			FOR SUPERVISION RECEIVED: General from Production Engineer	HOURS Regular day. 5-7 hour days and 1-5 hour day per week
REPORTS Find and enter				

Fig. 2: An example of description or specification for an hourly job

Name (s)

SALARIED JOB SPECIFICATION

Date 6/2/43
Rev.

Tot. Pts. Gr. No.

Position Jr. Geologist Dept E. & D. Geol. Div. Southwest Texas

Sec., Loc., etc. Title Immed. Supervisor District Geologist

Under general supervision; assembles geological data and makes routine subsurface studies; prepares cross-sections, structure and isopach maps; constructs new base maps and assists in posting well data to base, pool and regional maps; scouts special wells and attends scout check meeting; prepares and assists in preparing various reports and records.

1. Receives assignment of areas to be studied from superior or Asst. District Geologist; consults with them on various phases of studies before maps are placed in final form; calls to their attention any structural indications that may develop in the course of study. Assembles driller's logs, data from scout reports, electrical logs, and other geological data; picks formation tops, either producing sand or paleontological points, and correlates data; prepares cross-sections, structure maps, and isopach maps to depict structural features of the area (structure maps are contoured on one or more horizons in order to present structural features). As additional subsurface information is obtained, corrects cross-sections and structure maps.
2. Constructs base maps from ownership maps, plats, seismic maps, aerial maps, parts of two or more maps, etc.; draws maps on tracing cloth to desired scale. Assists in posting data from scout tickets to pool and regional maps during peak periods and answers questions of map draftsman concerning the posting of geological data from scout reports.
3. As assigned, scouts special or important wells; secures geological data by visual examination of cuttings and cores and by obtaining depths, shows, results of drill stem tests, etc. from operator or driller; prepares core record on cores examined; keeps superior informed of important developments. Attends scout check meetings as substitute for District Scout due to absence or vacation.
4. Assists in the preparation of semi-annual new discoveries report and annual production and reserve estimate report by assembling and tabulating data from R. R. Commission reports, previous reserve estimates, scout reports, etc. Revises reserve estimates on some leases and pools based on added development and submits revised estimate to superior for check. Infrequently goes to field with superior or other geologists to observe coring operations, drill stem tests, etc. to become familiar with the department's function in completing wells.

MENTAL EFFORT Intelligence Grade: B

Educational Requirements & General Knowledge: College 4. Geology.

SKILL

Specific Knowledge to Start: How to select information from scout reports, maps, well logs, etc.; how to prepare maps and post geological information to maps; how to draw cross-sections, correlate well logs, and prepare structure maps.

Where Acquired & Time to Acquire: 1 year in geological dept. of an oil company and should include some map drafting and field work.

Knowledge Acquired on Job & Time for Minimum Proficiency: Geography of the district and familiarity with the general geology of the area; more detailed knowledge of electrical logs; how to prepare core records; familiarity with coring and drilling methods; additional knowledge in the construction of cross-sections and structure maps; acquaintance with personnel and outsiders whom he will contact. 4 to 6 months.

PHYSICAL EFFORT Activity: Sitting; Occasional trips to the field. 100 to 200 miles per month

Special Physical Requirements: None

RESPONSIBILITY

MEN: None

MATERIALS: Using - Supplies

EQUIPMENT: Operating - Office, Transportation

MARKETS: Interviewing - Competitors, Vendors

MONEY: Using - Cash (occasional)

METHODS: Executing, Selecting - Procurement

RECORDS: Transcribing, Securing, Originating, Interpreting - Procurement

WORKING CONDITIONS Reg. Working Hours: 8 hours per day, 5 days per week

Required Overtime: None

Surroundings, Hazards, etc.: Normal office, some travel and oil field

REMARKS Occasionally drives a company car. Obtains an expense advance as necessary.

Specification Approved _____

ist because he will have to do more of the tasks requiring physical effort. This factor could be called "physical effort or physical requirements" of a job.

The conditions under which individuals work, that is, hazards, dust, fumes, the hours of day or night, etc., might go to make up another factor which could be called "working conditions." Certainly, "responsibility" would be greatly different in the case of the chief chemist and the college graduate.

"Responsibility" as a factor which is different in any two jobs and could be compared, might be broken down into responsibility for men, equipment, materials, records, methods, money, and markets.

Other factors might be used, but too many lead to impractical comparisons of various factors which make up a job. Experience of job analysts and salary committees has shown that the number of factors should be between four and seven because it is less difficult to comprehend each and compare it with the same factor in another job.

First Step in Evaluation

The first operation or step in job evaluation work is to answer the question "What is the job?" This can be done by describing the job accurately and concisely, setting out what duties must be performed, responsibility limits, supervision received, and supervision exercised. An example of a job description or job specification for an hourly rated job is shown in Fig. 2. Abbreviation is necessary in every job description and rules of good English are sometimes violated to obtain brevity, but it is quite important to have descriptions accurate enough to reflect difficulties and importance of the duties of each job.

The second step is to compare jobs with other jobs, factor by factor, and convert the difference in various factors into money value. This process is long and complicated if no previous system of job classification or job evaluation exists within a company. It is quite necessary that management determine policies which will serve as a measuring stick for the job analyst in converting job difficulty to money value at the original installation of any job evaluation plan. Also, it is necessary that management decide where they shall rank compared to the average labor market, that is, should the corporation concerned pay below the average, pay the average, or pay above the average for similar type of work done in competing firms? It is recognized that economic conditions warrant changes in policies from time to time, but once difficulty and importance ratings have been established for jobs

Fig. 3: A typical salaried job specification in the exploration department

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3 of the 7

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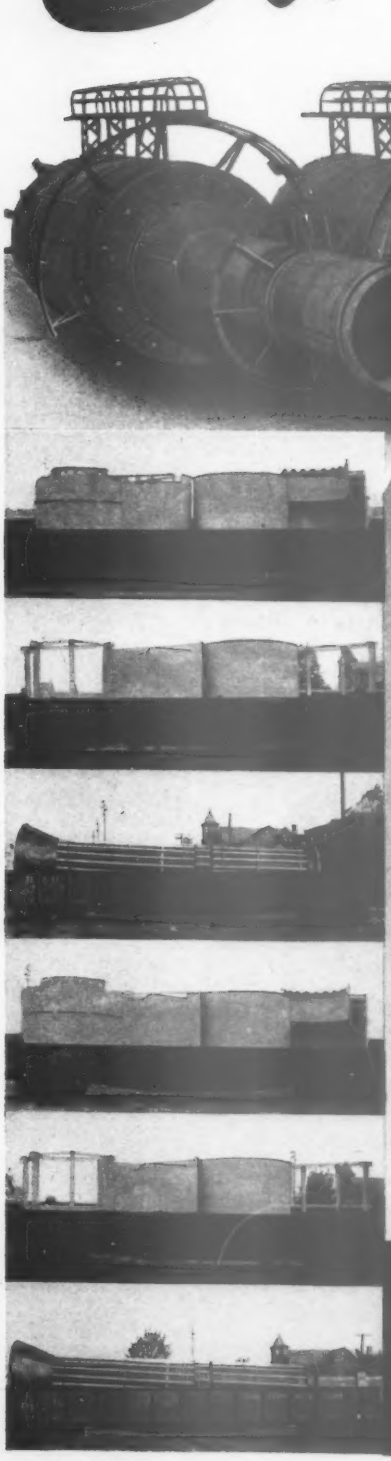

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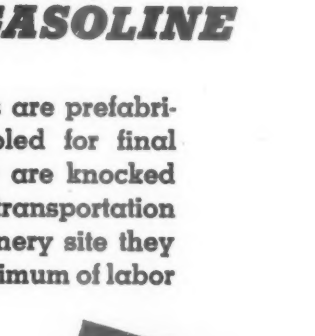

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which have been set up as having relative value to the company the entire salary or wage scale can be moved up or down to meet changing economic and competitive conditions. It is the purpose of job evaluation more to keep the relative value of a set of duties within a company the same throughout than to attempt to meet wages and salaries of competitive firms.

In the petroleum industry, questionnaires can be used to obtain most of the facts from clerical, supervisory, and technical employes. Added to the questionnaires would be a brief interview by competent job analysts to obtain additional facts and to determine conditions under which work is conducted. From these facts a job description can be prepared. Fig. 3 represents a typical salaried job specification in the exploration department of an oil company. Questionnaires are not generally used in the case of hourly rated workers and all facts concerning the job are obtained by interview. The reason is not because of the intelligence level of hourly rated workers but because they lack the necessary clerical aptitude to fill out questionnaires. After job descriptions or specifications have been prepared they should be checked by the supervisor of the job and in some cases checked by the employe performing the duties. This is important because the description of duties must be a statement of fact. Also, it does not suffice to have a description of a job in general, that is, what a geologist, engineer, or lease pumper does in general because it may not describe the duties of any particular job. The specific duties performed are what determines the job difficulty and importance differential.

Supervisory Judgment Supplemented

Job evaluation should not take away the prerogative of supervisors and department heads in determining what a job is worth. Instead it should assist them in determining the relative value of jobs under their supervision by comparison. In the administration of job-evaluation work in one oil company, it is the job analyst's responsibility accurately to describe a job and to recommend to the appropriate salary committee a rate or salary range for the job. It is the department head's and personnel department's prerogative to agree with the job analyst or take exception to his recommendations. In all cases the appropriate salary committee has the final approval of hourly rates or salary ranges.

Byproduct values for job evaluation are many. As examples, supervisors and industrial engineers can use job descriptions in reengineering jobs; auditors and methods men can use description of duties and job specifications to find red tape and eliminate duplication in accounting procedures; supervisors and the personnel department can use job descriptions and salary ranges to an advantage in employing, transferring, and promoting individuals.

SALARY SCALE

*Grade	Point range	Sal. range 40-hr. week dollars per month
1	56-60	$ 86-115
2	61-67	96-128
3	68-75	107-142
4	76-83	119-159
5	84-91	131-175
6	92-102	144-192
7	103-113	162-216
8	114-125	180-240
9	126-138	198-264
10	139-153	220-292
11	154-171	244-325
12	172-189	271-362
13	190-210	300-400
14	211-234	332-443
15	235-260	371-495
16	261-288	412-550
17	289-320	457-610
18	321-355	508-677

Employes participate in job evaluation through questionnaires and interviews, and with some companies an employe is permitted to see his job description and know the salary range of his job which aids in a better understanding between employes and management and should produce better labor relations. Management can use job evaluation as a basis of settling controversies over wages.

Where some job evaluation plans have fallen short is the failure to set up adequate procedures for restudy and reevaluation of jobs. The fact that a job is a group of duties and responsibilities immediately brings to mind the fact that jobs change as duties are eliminated or added. Periodically, then, job descriptions must be reviewed for accuracy and the necessity of adjusting salary ranges. Expansion and changes in plant operation, lease operation, etc., frequently bring new jobs into the picture which must be studied and evaluated. In some companies, experience shows that the direct cost of the administration and maintenance of job analysis and evaluation is from ¼ of 1 per cent to 1 per cent of the total payroll, depending on the size and kind of operations. Costs will and do exceed this during the initial installation of the plan. Part, if not all, of this cost is recovered in time saving to department heads and salary committees in administering wages and salaries. Some oil companies use job evaluation on all jobs below $5,000 per year while others include jobs as high as $10,000 or $12,000 per year. Job evaluation should not add to the total payroll, but should equitably distribute the payroll according to the difficulty and importance of each individual's job.

Tables 1 and 2 illustrate how some hourly rated jobs and salaried jobs

(Continued on page 98)

TABLE 1—HOURLY RATED JOBS

Job title	Mental effort	Skill	Physical effort	Working conditions	Responsibility	Total points	*Base class or rate in dollars per hr.
Porter	5	6	36	9	4	60	$0.61
Watchman	13	7	26	15	16	77	.76
Roustabout, starting	10	10	50	13	6	89	.88
Roustabout, skilled	10	16	50	13	9	98	.97
Lease pumper	20	20	25	11	24	100	1.00
Derrickman	10	19	49	14	12	104	1.03
Truck driver	19	22	33	11	22	107	1.06
Pulling unit operator	19	22	41	12	18	112	1.12
Carpenter	23	27	34	11	16	111	1.12
Field mechanic	23	27	37	12	16	115	1.15
Welder, first class	19	30	36	16	22	123	1.24

Note: These hourly rates are not rates paid by any company and are for illustrative purposes only.

*Jobs are not graded closer than 3-cent intervals. 60-61-62 points carry a $0.61 rate, 63-64-65 points carry a $0.64 rate, etc.

TABLE 2—SALARIED JOBS

Job title	Mental effort	Skill	Physical effort	Working conditions	Responsibility	Total points	*Grade
Clerical positions							
Office boy	15	12	20	4	8	59	1
Receptionist	18	15	18	4	9	64	2
Typist	22	18	18	4	9	71	3
Jr. record clerk	19	15	15	4	15	68	3
Jr. stenographer	23	22	16	4	14	79	4
Jr. tax clerk	26	23	15	4	20	88	5
Plant ledger clerk	35	31	15	4	23	108	7
Payroll auditor	50	32	15	4	31	132	9
Asst. purchasing agent	54	56	15	4	51	180	12
Senior accountant	68	66	15	4	58	211	14
Asst. chief accountant	91	73	15	4	90	273	16
Senior attorney	120	73	15	4	81	293	17
Chief accountant	108	88	15	4	116	331	18
Supervisory and technical positions							
Jr. geologist	54	20	16	5	22	117	8
Jr. engineer	43	22	24	11	15	115	8
Farm boss	33	34	22	11	53	153	10
Field engineer	61	41	22	11	46	181	12
District geologist	91	66	16	5	75	253	15
District supt.	75	73	20	9	99	276	16
Research geologist	120	66	16	5	64	271	16

Note: These salary ranges are not salaries paid by any company and are for illustrative purposes only.

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2. ENDLESS BELTING ELIMINATED CLAMP DEFECTS.

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3. IMPROVED BONDING GIVES RESISTANCE TO FATIGUE.

Tensile strength and stretch characteristics were worked out to a satisfactory degree; then serious thought was given to obtaining a stronger bonding between the plies and a bonding of friction that would resist fatigue.

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Oil-Field Flooding Streamlined for War—

A Suggestion—

*by Frederick A. Squires**

The installation of water-flood projects in which the tract is completely redrilled takes considerable time before increased production is obtained. Under wartime conditions, it is suggested that this delay may be reduced by using wells already drilled. Flooding with salt water from higher sands has also yielded satisfactory results in many Illinois fields.

WAR needs more oil and needs it now. Increasing the supply by flooding under the usual method is too slow for this emergency. It is to suggest a way by which production from flooding may be speeded up that this paper is presented.

The usual flooding technique requires plugging of all existing wells and redrilling an entire new pattern. Since depth to the producing sands determines the cost of drilling, operations are begun in the shallowest horizons and, if financially successful, are later extended into deeper pools. In the southeastern Illinois oil field the deeper sands are generally richer.

There is going on in Illinois at the present time a flooding project, the well spacing for which is shown diagrammatically in Fig. 2. This work is being done by men skilled in the art of flooding in Pennsylvania, Kansas and Oklahoma. It will be noted that the spacing which they follow in their Illinois project is 660 ft., water well to water well. Many other Illinois sands are more permeable than the sand on which this flood is operating. The unusually high per-

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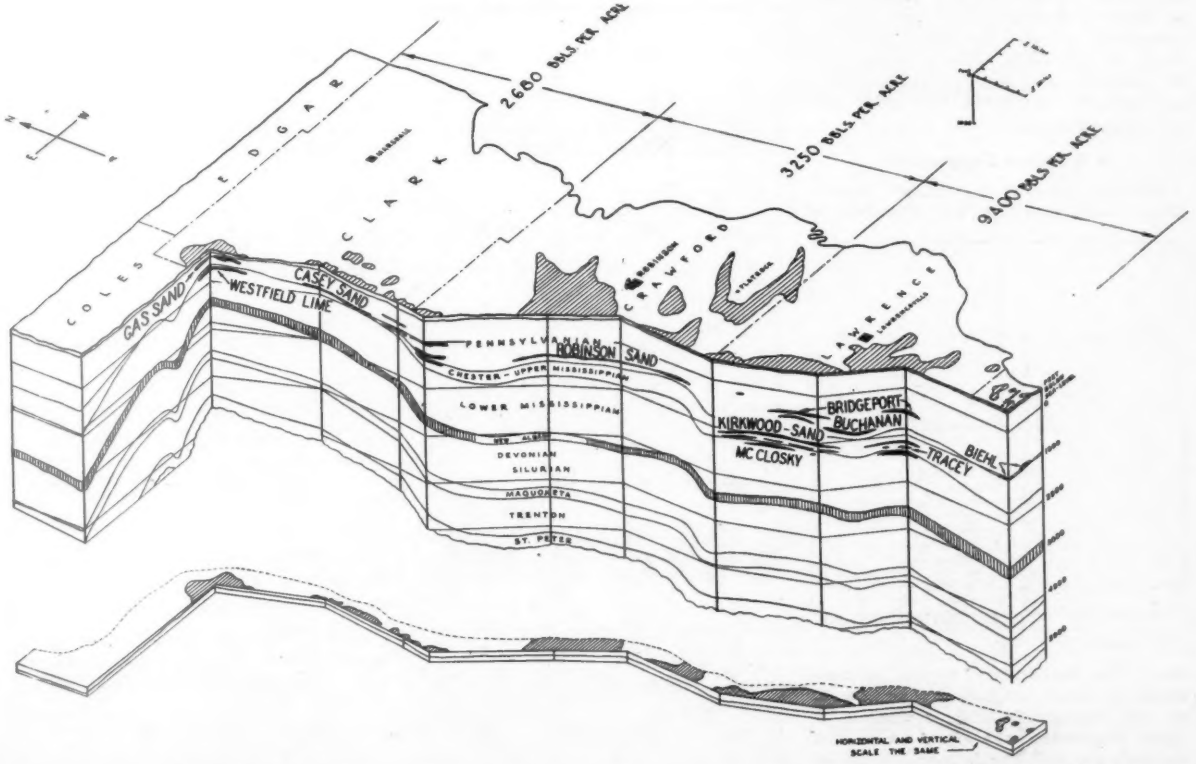


Fig. 1: Block drawing showing the relative depth and average oil production per acre up to end of 1942 of Clark, Crawford, and Lawrence County sands. It illustrates the advantage of flooding the deeper sands

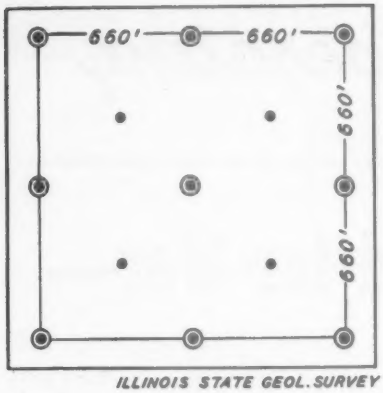


Fig. 2: The flooding pattern for an operation now under way in Illinois. The territory was selected because the oil sand is found at a shallow depth. It is located in a part of the old Illinois fields where the average oil recovery was low. In spite of a lower oil recovery, a greater profit may be realized in comparison to deeper, richer territory because of the lower cost of well drilling which is the major expense in a redrilled flooding operation. The water-input wells are 660 ft. apart

meability of many Illinois oil sands is the key to this proposed method. Sands of low permeability would, of course, require closer spacing.

Territory for the project shown in Fig. 2 was selected because it was the shallowest available in which past production history gave promise of successful recovery by water flooding. Since all old wells were plugged and the property was redrilled on a different pattern, depth to the sand determined the cost.

A Wartime Suggestion

Because time is of critical importance, war justifies an attempt to streamline the technique of exploratory and development work in water flooding. The following method is therefore suggested. This would consist of using only old wells by: (1) Inclined coring in input wells; (2) using alternate staggered wells for water-input and oil-producing wells; and (3) flooding with upper salt water in a closed system. Because depth would not determine costs, the rich deep southern pools could be

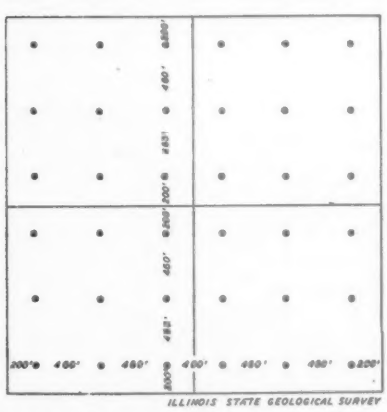


Fig. 3: The standard well pattern for practically the entire oil-producing territory in the old Illinois oil fields, regardless of depth. Comparison with Fig. 2 shows that the wells are more closely spaced in the old field than in the redrilled pattern for the flooding operation

Fig. 4 (right): Proposed well pattern for water flooding without new drilling by conversion of alternate producing wells into input wells. Tract A will have a single square at its center (marked 1), the corners of which are formed by water-input wells, each 460 ft. from the center oil well; this will be surrounded by eight asymmetrical tracts. Tract B will have a water-input well at the center which forms the common corner for four asymmetrical areas each of which has three distances of 460 ft. to the included oil well and one distance of 400 ft. Note that the oil well is always at the crossing of lines joining opposite water-input wells

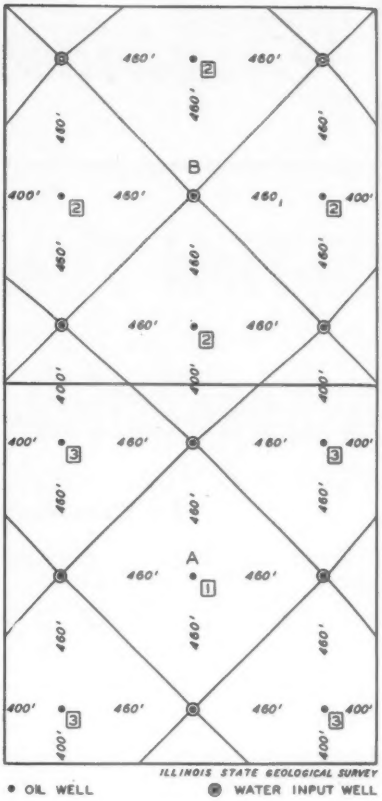
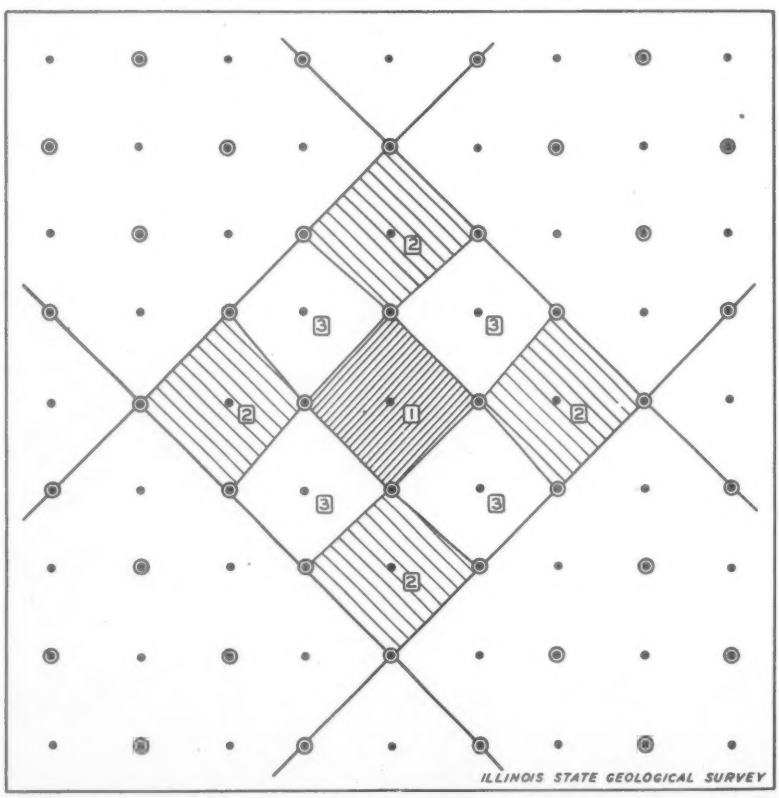


Fig. 5 (below): The same well pattern as that shown in Fig. 4 on a smaller scale to show how the pattern repeats. The square pattern in the center of this drawing and marked 1, 2 and 3 covers 80 acres and is repeated without change all over the field. It consists of one symmetrical and eight slightly asymmetrical tracts



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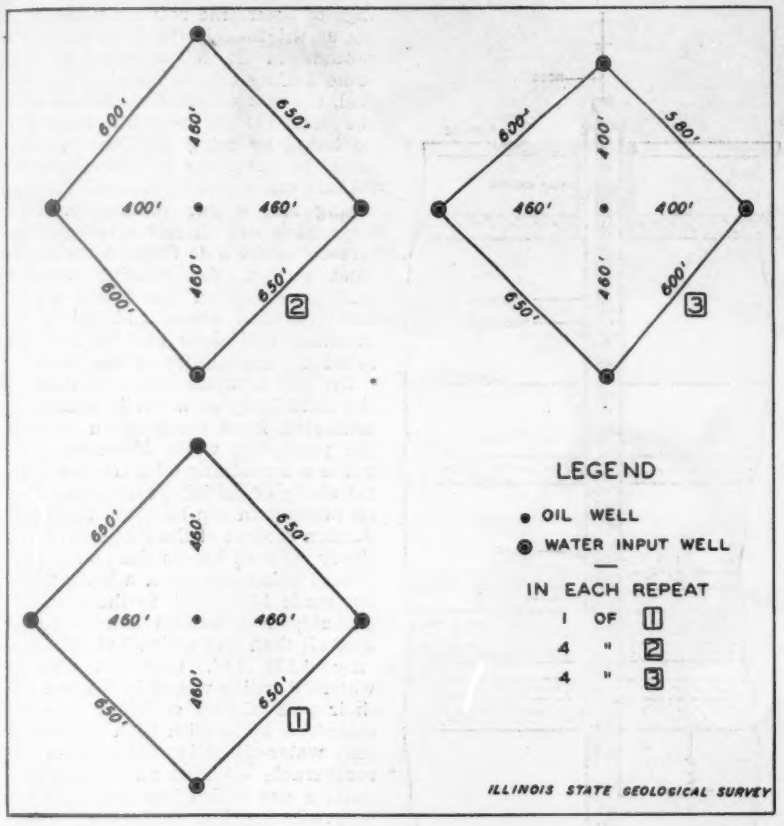


Fig. 6 (above): This diagram shows the distances from water well to water well, and oil well to water well in the pattern shown in Figs. 4 and 5. Note that each repeating pattern gives nine areas, one like (1) and four each like (2) and (3)

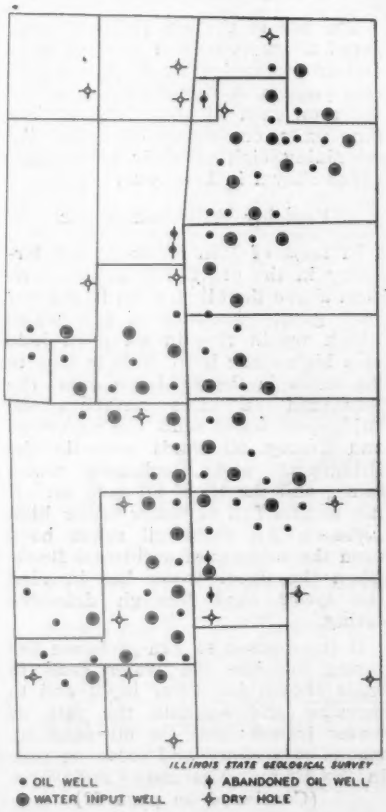


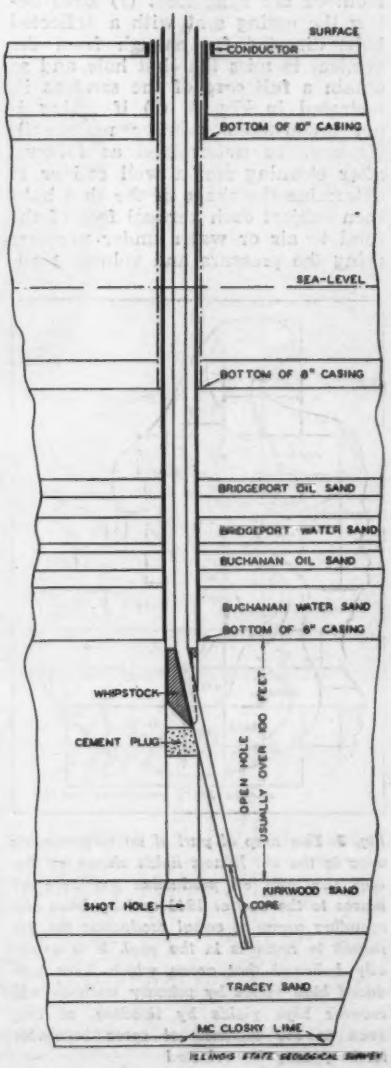
Fig. 7 (left): A possible flooding development in a pool in the old Illinois oil fields. Its probable success is indicated by the facts that (1) the territory has been unusually rich, (2) the producing sand has no gas and very little water, (3) in other nearby areas in the same sand, repressuring has shown that the sand is unusually permeable, (4) there has been a large number of accidental floods on this sand in nearby areas that have produced large amounts of oil, and (5) the distance between wells in the nearby areas has been traversed by water which has increased production within 6 months of the start of flooding

Fig. 8 (right): A proposed method of coring the oil sand by directional drilling in an old Lawrence County well cased in the usual manner. There is considerable amount of open hole above the Kirkwood (Cypress) sand. When found in the same well the Kirkwood, Tracey, and McClosky are produced together in an open hole below the cased-off Buchanan water sand. The method is also applicable to the Tracey and McClosky. It is to be understood that the horizontal dimensions are greatly exaggerated and that the deflection shown from the vertical is much greater than can be obtained in the 100 ft. of open hole above the Kirkwood sand

flooded almost as cheaply as the light shallow northern pools.

The standard spacing in the old fields of Illinois is shown in Fig. 3. Note that if alternate staggered wells were converted into water-input wells, the maximum distance from water well to water well would be 650 ft., or 10 ft. less than that of the flooding patterns shown in Fig. 2. A diagram of the resulting pattern is shown in Fig. 4. The repeating unit is shown in Fig. 5, and the distances involved appear in Fig. 6. Fig. 7 shows the application of the method to an Illinois oil field in which accidental flooding of nearby areas in the same sand resulted in production of an average of 6,000 bbl. per pumping well for nine cases of accidental flooding. It is believed that many Illinois oil sands are as permeable as that in the pool shown in Fig. 7.* If this is the case, water under a 1,000-ft. head will travel through many Illinois

*Squires, F., and Bell, A. H., Water Flooding of Oil Sands in Illonois: Illinois Geol. Survey Rept. Inv. No. 89 (in press).



sands at a speed of one location in about 6 months.

Acquisition of Subsurface Information

The advantage gained by drilling and coring new wells before flooding fall into two general classes: (1) Information as to porosity and permeability of the sand, its oil and water content, and the probable oil recovery, and (2) information as to presence of streaks of such excessive permeability as to require cementing off and information as to the best location for the packer to shut off upper gas sands. At least one such new well should be drilled and cored on every operation and could be placed to occupy an undrilled location in the old drilling pattern.

Old wells provide little subsurface information because neither cores nor good well records are usually available. In order to obtain the most important part of the information which would normally be given by the core from a new well, the following three methods are suggested: (1) Drill below the casing seat with a deflected hole, directed far enough from the vertical to miss the shot hole and so obtain a full core of the sand as illustrated in Fig. 8; (2) if coring is not undertaken, relative permeability may be determined as follows: after cleaning run a well caliper to determine the shape of the shot hole, then subject each vertical foot of the sand to air or water under pressure using the pressure and volume readings to determine relative permeability as the hole is filled up from the bottom in 12-in. increments with some sealing compound such as jelly seal, the seal would be removed after the test; (3) permeability may also be tested by using the Dow "electric pilot" to locate the interface between oil and salt water introduced through casing and tubing separately. Then by raising the oil and salt-water interface, in the hole through the entire sand section, the relative volumes and pressures on the fluids forced into the sand above and below the interface will show foot by foot the relative permeability of the sand.

Oil and connate water content of the sand body as a whole cannot be estimated from cores taken so near old producing wells. However, as a guide to remaining oil content a careful study of initial, yearly, and total oil production can be made from production records of the leases involved. Every oil man knows that, other conditions being the same, a lease which has made 14,775 bbl. to the acre will probably still contain more recoverable oil than one which has produced only 1,639 bbl. (Fig. 9). Present water-oil ratios would be known and their past history could be approximated. A lease with high present or past water-oil ratio will contain less recoverable oil than an equally productive one which has produced and is producing but little water with its oil.

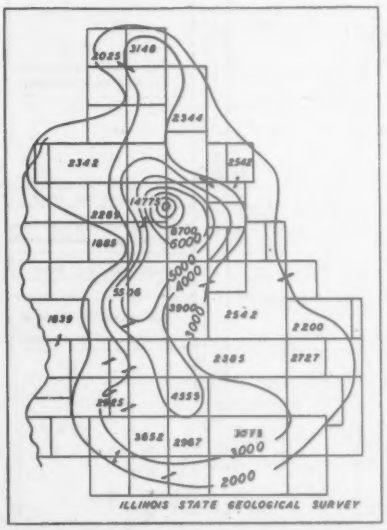


Fig. 9: This map of part of an oil-producing area in the old Illinois fields shows by figures the total oil production per acre by leases to the end of 1942 and by lines surrounding areas of equal production the variation in richness in the pool. It is generally believed that areas which have produced high yields by primary methods will recover high yields by flooding, so that even in the absence of cores favorable territory may be selected

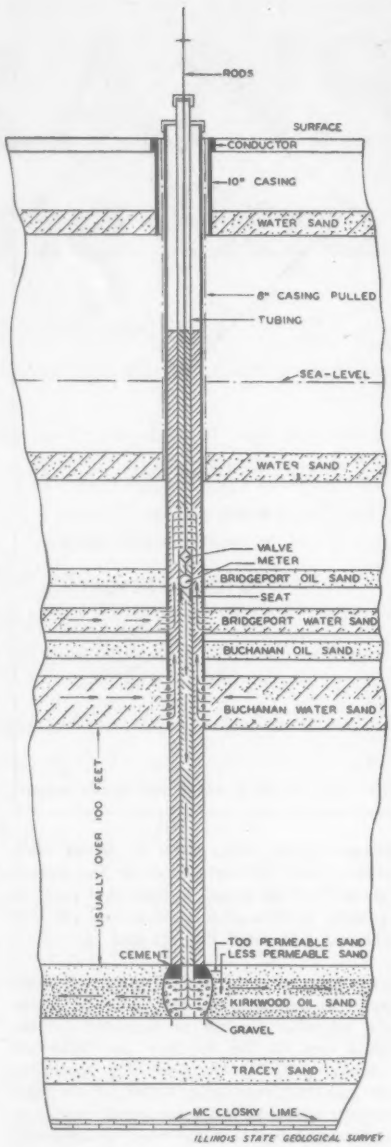


Fig. 10: Diagram showing a proposed method of flooding a Kirkwood well from the Buchanan and Bridgeport water sand. The proposed method applies also to the Tracey and McClosky which occur below the Kirkwood. The casing is gun-perforated opposite the water sands. A packer is run on tubing and cemented just above the sand to be flooded. Where a too-porous streak in the top of the sand in the shot hole is encountered, the bottom of the tubing is perforated below the porous streak and gravel is filled in the shot hole to cover the perforations. On this gravel, the well is cemented. A perforated joint of tubing occurs above the water sands which allows any solid matter such as floating sand to settle out before the water enters the tubing. A meter and valve is run on rods and landed on a seat in the tubing. Periodically the meter and valve is withdrawn on the rods and if the input is found to be too great, the valve is adjusted

The Suggested Flooding Pattern

The use in the old fields of staggered alternate wells for water input and oil production would give a five-spot pattern. A repeat pattern would occur on each 80 acres, divided into nine units, one symmetrical and the remaining eight slightly asymmetrical as shown in Figs. 4 and 5.

Flooding With Salt Water

In most of Illinois' producing territory in the old fields, at least one sand above the oil stratum is charged with great quantities of salt water which would rise in an open hole to a high static head. This is true of the sands in the Robinson area—the Buchanan oil sand underlies the Bridgeport water sand, the Kirkwood and Tracey oil sands underlie the Bridgeport and Buchanan water sands, and the Biehl oil sand underlies a sand full of water under high pressure. All these oil sands have been the subjects of accidental floods when the upper water has invaded the lower sand through defective casing.

It is proposed to gun-perforate the casing opposite the water sand in wells chosen for water input and to measure and regulate the rate of water inflow into the oil sand by means of a meter and valve on rods in the tubing. The meter and valve

(Continued on page 63)

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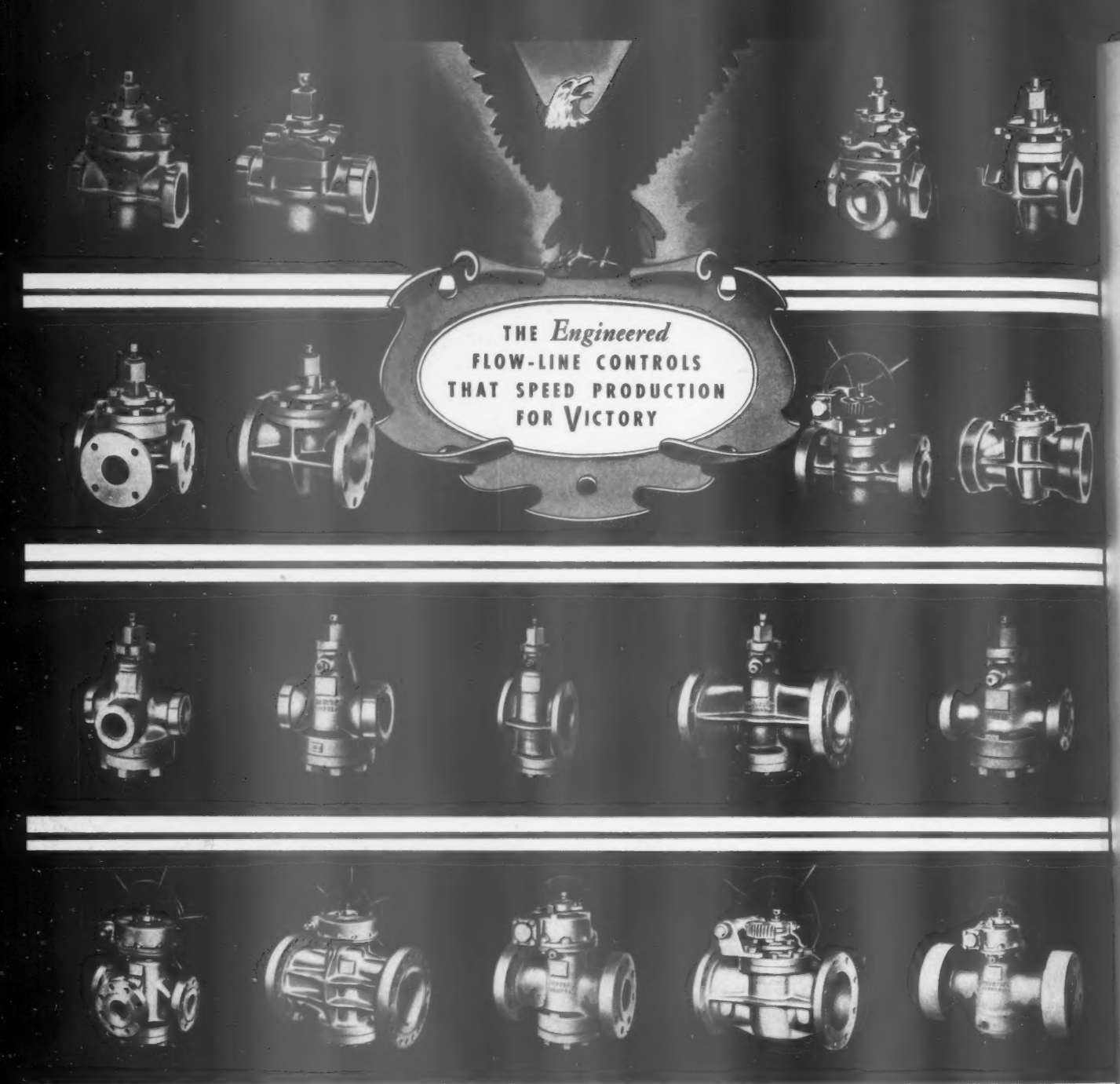

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Vacuum-Operated Column Reconditions Gas-Cut Drilling Mud

RECONDITIONING drilling mud, which is contaminated by gas trapped in the fluid while drilling deep wells, has been and is being done by the aid of various types of equipment ranging from the simply constructed baffle flume to more intricate and expensive units. In order that adequate facilities may be available at any time during the progress of drilling if gas begins to cut the drilling mud, Bell & Loffland engineers have designed a portable degassing unit operated by a vacuum jet, which may be installed quickly beside the suction tanks or conductor flume and piped for instant use by starting an auxiliary mud pump

The principal section of the degassing unit is made by fitting staggered baffles in a tower approximately 30 in. inside diameter and about 14 ft. high, closed at both ends with flat welded heads. Midway between the last baffle and the top head are two inlet nozzles, inserted through a threaded collar, exactly opposite each other. These nozzles contain steel especially resistant to abrasion and wear because of the impact of mud containing sand. It is especially important that these nozzles be carefully selected so that wear will be minimized, else the tips will cut quickly and thereby reduce the effectiveness of the degassing unit.

Operation of Degasser

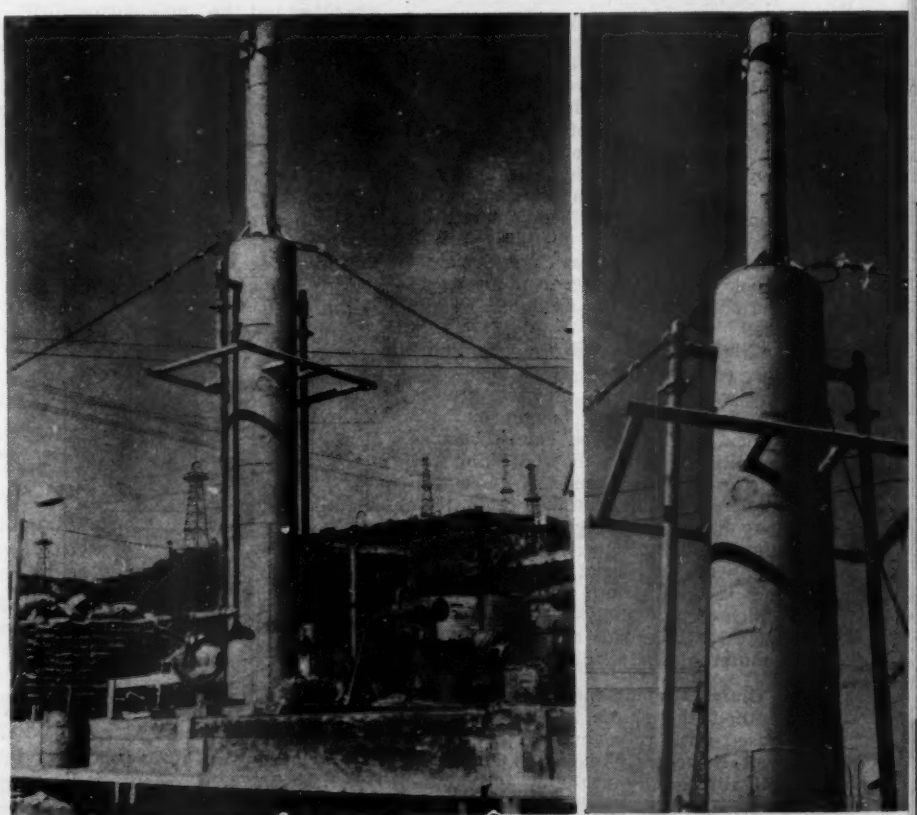
An extension is attached to an opening in the top head, about 8 ft. long, also containing staggered baffles and equipped with a steam-operated vacuum jet to pull a vacuum on the interior of the unit and effect the removal of entrained gas from the mud passing through the column. The steam, which is used to operate the vacuum jet, with the exhausted gases flow to a stack nearby so that they may be released safely to the atmosphere.

To operate this type of degasser, it is necessary to provide an auxiliary receiving pit or mud tank so that the stream of fluid can be diverted from the usual channels to a container from which it is picked up by the auxiliary pump. The discharge line from the pump is connected to a header having connections for splitting the stream so that an equal volume will flow through each injection nozzle at the top of the column. The pressure of the pump forces the opposing streams of fluid passing through the nozzles to impinge upon each other which breaks the mud and thus releases a large amount of the entrained gas. The mud falls by gravity across each succeeding baffle and is released at the base through a pipe line leading the clean fluid to the suction pits.

Steam is admitted to the vacuum jet in sufficient amount to produce only the vacuum required for the complete removal of the gas. The length of the column and the superimposed smaller section are sufficient to prevent pulling mud over through the disposal line. In any event, the mud is commonly weighted when formations are expected which contain gas in quantities under pressure great enough to contaminate the drilling fluid, and the additional weight is sufficient to cause the mud to fall quickly to the base and out of the column to the pump suction pits.

Loops are welded to the head of the large section of the column to attach guy wires to prevent rocking and weaving because of pump shock and high winds. A platform skeleton frame is attached to the upper part of the column so that an employe can inspect the inlet nozzles. It also provides a guard for the connections when the unit is placed on a truck for moving. A substantial split shield is clamped to the top of the smaller section surrounding the vacuum jet to prevent damage to this fitting when erecting, lowering and transporting the unit from one location to another.

Left: Degassing unit used by Bell & Loffland which is installed beside the mud flume near the circulating pumps of a drilling well in Ventura, Calif. Right: Upper section of mud degassing unit, showing location of impact nozzles and protective frame welded to the side of the column



Oil-Well Pumping Practices—No. 20

Counterbalancing of Unit Pumping Installations

In this installment the author continues the discussion begun last week, going into detail about the methods used to determine the counterbalance conditions of a well. He discusses particularly those methods which employ dynamometer cards, and the proper use of them.

by J. Zaba

IMPORTANCE of counterbalance to the proper operation of a pumping installation has already been discussed in the preceding chapters of the series (Installments 14 and 19). Existence of a large number of factors, affecting the counterbalance requirements and making it practically impossible to calculate, accurately, the counterbalance requirements, was also emphasized. Observation of performance of the surface equipment, to determine whether or not the well is properly counterbalanced, may quite often lead to entirely erroneous conclusions. It follows therefore that methods are needed which could be used for checking, with reasonable degree of accuracy, the counterbalance conditions of a pumping well. Such methods are needed first for testing of new installations to determine how well the roughly calculated counterbalance meets the well requirements. They are also needed later, during the producing life of the well, when changed operating conditions may require adjustments in the counterbalance used. The changes in operating conditions may include changes in operating cycle or changes in well characteristics, such as change in fluid level, in fluid water content or in the amounts of gas produced by the well.

The methods used for examining the counterbalance conditions of a well can be divided into two groups. To the first group belong methods which determine the counterbalance conditions of a well by testing the performance of the surface equipment of the installation. Such tests may be made either by proper handling of the surface equipment itself or by use of special instruments. To the second group belong methods which employ analysis of dynamometer cards as means of examining the counterbalance conditions.

Clutch slipping method.[1,2,3]—In this method the clutch is gradually released until it begins to slip. If the well is properly counterbalanced it will slip equally on the up and downstroke. If the well is out of balance the clutch will slip and slow down in one part of the stroke and catch and speed up in the other part of the stroke. The speed variations can be conveniently observed on the crank. Adjustments then can be made in counterbalance weights to bring about conditions of more uniform speed of the crank and performance of the clutch. The throttle of the engine must be set at a fixed position during such a test.

Tachometer method.—The use of this method, which depends on measurement of speed of the crank, may result in erroneous conclusions in case of installations with large flywheel effect. A flywheel, interposed between prime mover and the crank, smoothes out the loads during different points of the stroke. The effectiveness of the flywheel is proportional to the square of its speed. Conditions may arise when the flywheel effect is sufficiently high to give constant speed although the well is not balanced properly.

Recording wattmeter method.—It has been stated in discussion of prime movers (Installment 18) that one of the advantages of using electric motors as prime movers of pumping installations is the ability to measure the power input to the prime mover. Such measurement permits determination of the instantaneous power input during different parts of the pumping cycle. By use of recording wattmeter these measurements may be recorded on a continuous chart. Reasonably equal current peaks for the upstroke, when the well load is lifted, and for the downstroke, when the counterbalance weights are lifted, would indicate conditions of a satisfactory counterbalance. Uneven current peaks indicate unbalanced conditions and proper adjustment of the counterbalance weights can be made until the peaks are equalized.

Fig. 1 shows a recording wattmeter chart for a well operating at a speed of 22 s.p.m. with a 52-in. stroke. Under counterbalance conditions are indicated since the current peaks for upstroke are much higher than those for the downstroke.

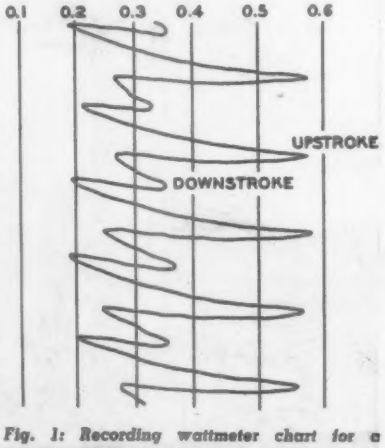


Fig. 1: Recording wattmeter chart for a pumping well

Dynamometer Card Analysis Methods

A dynamometer card records the polished-rod load which is a resultant of sucker-rod string loads (Installment 4). The correct counterbalance can, therefore, be readily computed from the card. This can be accomplished by use of the formula[4] (Fig. 2):

$$\text{Correct counterbalance} = C\left(\frac{A_1 + A_2/2}{L}\right)$$

where

C = calibration constant of dynamometer = lb. per in. of height of the card
A_1 = lower area, sq. in.
A_2 = upper area, sq. in.
L = length of card, in.

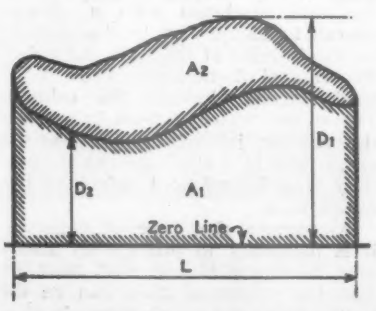


Fig. 2: Calculation of counterbalance from a dynamometer card

Photo U. S. Rubber Co.

Synthetic rubber crumbs being washed, at the $56,000,000 plant at Institute, W. Va., operated for the Government by U. S. Rubber Co. and Carbide and Chemicals Corp.

Drawing a BIG, NEW INDUSTRY *out of a* HAT

Anywhere else in the world, the idea would have been rejected as fantastic. It was proposed, in wartime, to produce a big new industry, practically out of a hat! Yet American resourcefulness and skill did the job—built a synthetic rubber industry to make the nation self-sufficient (if it wishes) in this vital commodity.

SPECIAL STEEL FASTENINGS NEEDED—Synthetic rubber plants, in which liquids and gases circulate in an intricate system, often under high temperatures and pressures, demand special steel fastenings in great quantity. A pioneer in the development of steels for high-temperature service, Bethlehem had a large share in meeting this demand, as the rubber program went into high gear.

Bethlehem's Bolt and Nut plant, already hard at work, swung into still higher production. Not only synthetic rubber plants, but the related high-octane gasoline program—and the shipbuilding program, too—needed many fastenings of specialized types, where standard fastenings could not possibly be used. More machines were put to work. More men and women workers were hired and trained. Between January, 1943, and the following July Bethlehem's production of carbon and alloy heat-treated studs was more than doubled. And the increase in production of Bethlehem-treated, oil-quenched nuts was almost as great.

With the rubber program accomplished, Bethlehem is now better able to fill other essential needs for high-temperature, high-pressure fastenings. Tell us about your problem. We'll help you if we can. Get in touch with the nearest Bethlehem representative, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

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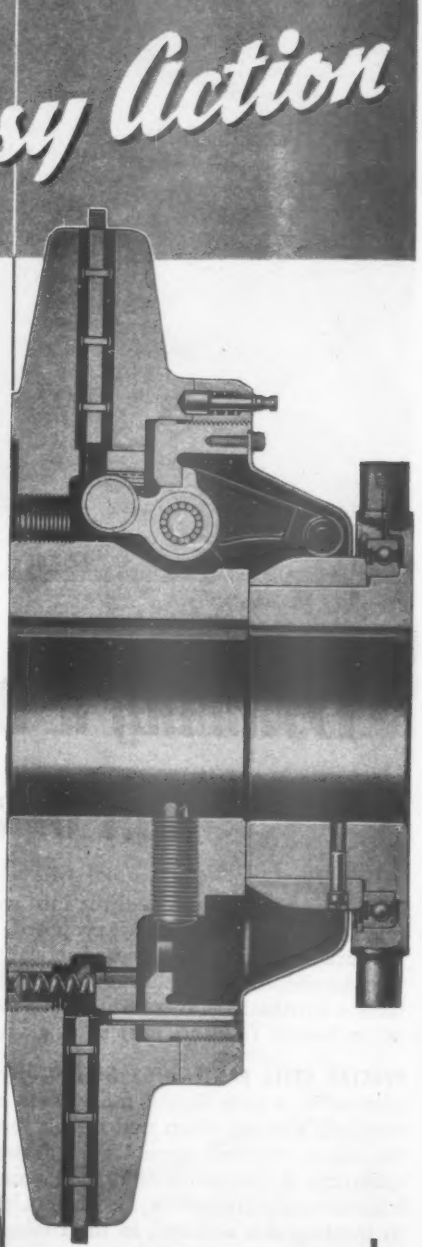


The easy action of the Twin Disc Model E Clutch is an inbuilt characteristic provided by sound engineering design and proved in the widest variety of heavy-duty applications.

First: Extreme ease in engaging and disengaging is assured by the bell crank lever-type mechanism.

Second: The clutch action is fully counter-balanced. This not only prevents drag, but eliminates any possibility of centrifugal force affecting the operation of the clutch.

Third: The levers are equipped with needle bearings at their pivot points. They operate on hardened and ground pins and are held firmly between compound bosses cast into the hub and back plate.

When you buy a rig equipped with Twin Disc Clutches, you are getting the benefit of over a quarter of a century of specialized clutch experience . . . that's why you'll find so many builders of oil field machinery furnishing Twin Disc Clutches as standard equipment. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin.

In a very few cases the shape of the load curve of a dynamometer card may give indication of the existing counterbalance conditions. This is true only in case of a certain type of dynamometer cards.[2] For instance in case of a dynamometer card shown in Fig. 3 location of maximum load directly above the minimum load would indicate good counterbalance. In general, however, detail analysis of card is needed to determine what steps have to be taken to correct the unsatisfactory counterbalance conditions.

An approximate method for determining torque from certain types of dynamometer cards has been outlined in Installment 14 of this series. In many cases a more accurate analysis

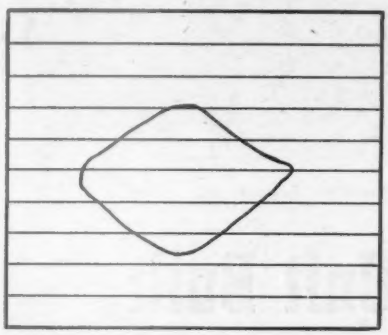


Fig. 3: Card indicating good counterbalance conditions

is desired. Such an analysis may, quite often, require considerable detail work.

Instantaneous power method. — A method has been presented of dynamometer card analysis in which the instantaneous power requirements are determined as product of instantaneous velocities and instantaneous loads.[5] The instantaneous velocities are obtained by first calculating the crankpin velocity from number of revolutions per minute and radius of crank. The line diagram of the pumping unit is then laid out and, beginning with the crankpin velocity the polished-rod velocity is determined by vector methods. The polished-rod velocities are secured for different positions of the crank, the corresponding effective loads being found from the load as shown by the dynamometer card, and from the counterbalance load. The instantaneous power can then be determined, for different positions of crank, as product of instantaneous effective load and instantaneous velocity. From instantaneous power, instantaneous torques can be calculated from relation between power and torque (Installment 14). The torques thus calculated can be then plotted for the purpose of analysis.

Graphical mechanics method. — Another method of analysis of dynamometer cards, for the purpose of examining the counterbalance conditions, is that offered by J. I. Laudermilk.[6] The method, based on use of graphical mechanics, is simple and can be carried through graphically with a minimum of calculations.

The starting point of the method is line drawing of the pumping unit investigated (Fig. 4). The drawing must be made to scale and accuracy is required if errors in solution of the problem are to be avoided. To determine the length of polished-rod travel, the highest and the lowest points of travel of the stirrup bearing are determined from the length of the crank and the pitman. From these points, lines are drawn through the saddle bearing, representing the corresponding beam positions, to points of intersection with line of travel of the horsehead. These points are then transferred to the line of travel of the polished rod. The dynamometer card is placed on the drawing in such a position that its base line is parallel to the line of travel of the polished rod. The length of the dynamometer card does not have to be the same as the length of the polished-rod travel, given in the drawing, since the scale of the polished-rod stroke can be projected to the scale of the card as shown in Fig. 4.

The well load and counterbalance torques are determined for different positions of the crank. The 30° intervals are usually sufficient. Method of determination of the torques is worked out here for one of the crank positions.

Point A on the path of the wrist-pin, corresponding to the selected crank position, is transferred through points A_1, A_2, A_3 to point A_4 on the part of load curve representing the upstroke. This determines the corresponding well load acting on gears through the pitman. The load, W_P, in this case 13,000 lb., is laid off along the line of pitman, using any selected scale, and is resolved into two components, one vertical and one parallel to the crank. The magnitude of the vertical component, creating the torque, can be read directly, using the scale representing load W_P. The torque due to the well load is the product of the vertical component and of the lever arm, that is the crank length.

The corresponding counterbalance torque is determined by prolonging the crank arm to the point of intersection with the circle of rotation of the center of gravity of counterbalance. This determines the point of action of the counterbalance load C_P. The direction of action of the load is vertically downward. This load is again resolved into two components. The product of the value of component vertical to the crank and of the radius of rotation of center of gravity of counterbalance is the counterbalance torque.

The net torque on the gear is the algebraic sum of the well and counterbalance torques. To arrive at such a sum, some mathematical signs must be agreed upon. As suggested by the author of the method, forces opposing rotation can be considered as positive, so that positive forces have principally to be dealt with.

The above given procedure is carried through for different positions of the crank. The results are tabulated and can be plotted as torque curves by using Cartesian or polar coordinates.

Purposes of analysis. — Once the torque curves for given conditions have been constructed, by use of any of the above-mentioned methods, counterbalance changes may be deter-

(Continued on page 59)

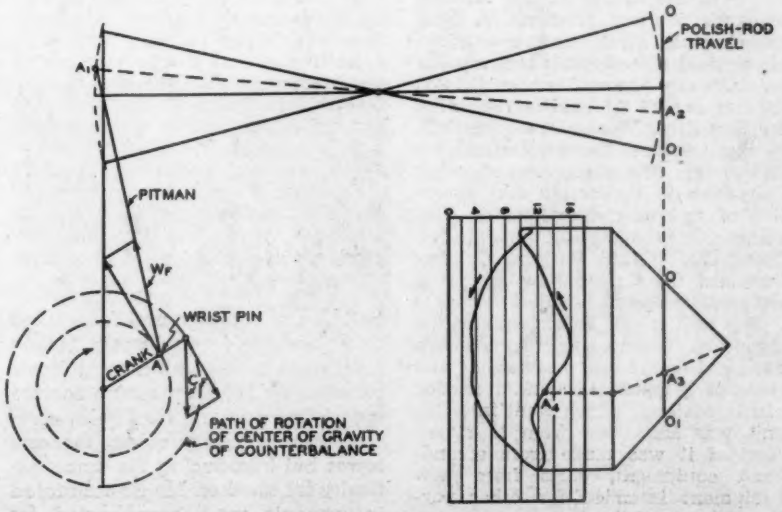


Fig. 4: Graphical mechanics method of torque analysis

Depropanizer and debutanizer sets, feed tank, wash tanks and caustic regenerator. Reactor not shown

Socony-Vacuum Codimer Unit Built Almost Entirely From Used Materials

by J. P. O'Donnell

COOPERATION of companies in exchanging information and data obtained from operating experience has contributed materially to the record of the oil industry in meeting demands for war products. A typical example is the selective phosphoric acid codimer unit recently put on stream by Socony-Vacuum Oil Co., Inc., at one of its smaller refineries, the East River Works, Brooklyn, N. Y. In this instance, Socony-Vacuum acknowledges the assistance of other companies in the design and operation of this unit. The help of Universal Oil Products Co., Sinclair Refining Co., Atlantic Refining Co. and Standard Oil Co. of New Jersey is cited particularly.

This unit is also an example of the ingenuity engineering departments have had to exercise in obtaining and revamping material to build needed plants. Material which went into this unit was assembled from 11 states. Most of it was made from second-hand equipment, parts from new equipment intended for other purposes. Some of the instruments were originally designed for foreign service and it was necessary to recalibrate them.

A study of the project was undertaken late last year. Three months were required to locate and assemble the necessary material. Construction was begun on May 1 and on June 15 the first charge was run to the reactor so that the actual time involved in building the unit and putting it on stream was approximately 6 weeks.

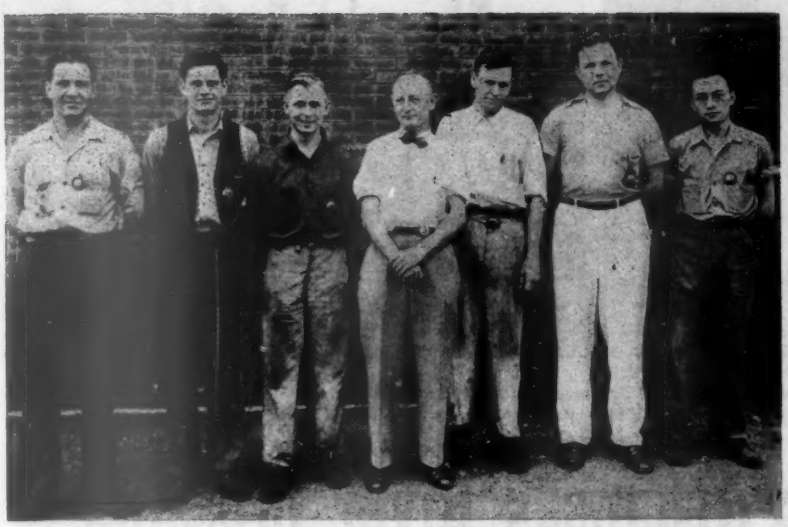
Briefly the chronological record of the project follows: Preliminary engineering studies were made by the refinery's own staff and by the technical service division of the company's general laboratories. Material was then sought out and earmarked for the job by correspondence. The bill of material was made up, PD 200 complied with and the economic study on costs prepared. These were submitted to Washington and on February 1, 1943, approval was obtained. Orders for material were immediately sent out and the preliminary layout and construction drawings begun.

Building a codimer unit from used and borrowed equipment offers problems: in this unit a used tower planned for 140-lb. pressure service was found suitable for 300-lb. service, solving the problem for one tower but introducing the same difficulty for another. Metric-calibrated instruments were recalibrated for this unit.

Equipment began to arrive about the middle of March and a month later the bulk of the heavy equipment had arrived. The layout and construction drawings were finalized and it was possible to begin construction on May 1.

The plant consists of:

1. Facilities for collecting butane from all debutanizers.
2. Butane depropanizer set.
3. Desulfurizing set including caustic wash, water wash, coalescer and regenerator.
4. Butane-butylene feed accumulator.
5. Catalyst reactor for 900-lb. working pressure.



Engineering staff, cracking department: J. E. Whitney, A. C. Brightman, K. C. Deemer, R. A. Coburn, K. M. Urquhart, F. Zmorenski and C. W. Chen

6. High-pressure pumps for feed, recycle and quench.
7. High-pressure preheaters.
8. Codimer debutanizer set.
9. Gasoline repressuring system.

Altogether 180 tons of steel were involved, excluding pumps, controls and instruments. The new material, required principally for the repair or alteration of the used equipment, amounted to less than 20 per cent of the cost of the unit. The search for material involved scores of inquiries that were almost nationwide in scope.

Some Equipment Unusable

Some of the equipment was found to be unusable but this loss was offset by the fact that other pieces were found to be suitable for functions other than those for which they were originally intended. For example, a rectifier, designed for 140-lb. operation, was scheduled for installation as a codimer debutanizer. On arrival, however, it was found to be suitable, with some alterations, for use as a 300-lb. depropanizer which had previously been unobtainable. While this ended the search for the depropanizer it started another for a debutanizer.

One of the unique features of the unit is the catalytic reactor. A Cross reaction chamber, set in a horizontal position, is used for this purpose. The catalyst is so arranged to provide all the advantages of multiple-chamber operation. There are other advantages in this arrangement which it is believed will develop some valuable information on the effects of variables in the quality and quantity of the product.

The reactor feed pumps are steam-charge pumps which were formerly used on the old Cross units. These pumps are 15 years old and were originally designed to handle gas oil. However, they are doing an entirely satisfactory job in this service despite the fact that they were designed for an entirely different purpose and their ability to handle this type of feed was questioned.

Instrumentation of Plant

The instrumentation of the plant is one of its more interesting features. Some of the instruments are very old and were converted for use in the new plant through the ingenuity of the company's instrument department. Others were obtained from a list of material originally scheduled for export. These instruments were calibrated in centimeters, liters, kilograms, etc., but after recalibration proved satisfactory.

Still another unusual feature of the unit is its layout. Because of the lack of available ground space it was necessary to divide it into two sections. This had the effect of complicating the operation of the unit but the complications have been minimized by team work among the operators and by telephone service between the sections.

Erection foremen: J. S. O'Callaghan, R. Goode and J. Hoenighausen

Operating Personnel

Operation of the unit is in charge of the refinery's cracking-department engineering staff headed by R. A. Coburn, cracking-department foreman for 7 of the 23 years he has been with the company. Other members of the engineering staff are J. E. Whitney, A. C. Brightman, K. C. Deemer, K. M. Urquhart, F. Zmorenski and C. W. Chen.

This was the third war project completed at this refinery. The first was the installation of equipment for the segregating of gas and naphtha streams. The second involved equipment for the catalytic treatment of Houdry first-pass aviation distillate and the catalytic retreatment of products of the first treatment.

Oil-Well Pumping Practices

(Continued from page 57)

mined which would lead toward equalization of up and downstroke torques. This usually is the purpose of the analysis since, fundamentally, the purpose of counterbalance is to equalize the peak torques during the up and downstroke. It should be noted, however, that counterbalance changes do affect many other operating characteristics of a pumping installation. Cards have been presented showing effect of counterbalance changes on polished-rod horsepower and peak polished-rod loads.[2] Indirectly, change of counterbalance may affect plunger travel and, what follows production.

If the purpose of the contemplated adjustment of counterbalance is attaining any of the above mentioned changes in pumping characteristics, then the card analysis must, of course, include consideration of factors affecting these changes.

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Left: The WEP 20-in. emergency bypass is probably the first oil line ever laid across a railroad bridge. Right: Special wood supports were built to hold pipe in a position where it would not interfere with operation of the railroad's equipment

Solution for Arkansas River Crossing Problems of WEP Pipe Lines

by Paul Reed

UNUSUAL measures for restoring flow through the War Emergency Pipelines, Inc., 24-in. crude-oil line after severe flood damage at the Arkansas River, have been studied by pipe-line men because of the importance of these contributions to the experience of the industry. No previous pipe-line crisis has been as serious from a national standpoint. In fact, the breaking of the pipe and the speed with which the situation was remedied attracted as wide public attention as current warfare activities.

Procedures adopted for solving problems encountered are briefly reviewed in this article, written while final dredging is being done to complete the laying of WEP lines across the Arkansas River.

By following the progress of WEP operations after the 24-in. line broke at the Arkansas River through the various stages of building a 20-in. bypass and relaying the 24-in. oil line together with laying the 20-in. products line it is possible to present information which has not been previously published. This article serves as a comprehensive survey of the unusual measures applied in solving the problems of this undertaking which is now nearing completion. Precedents set will influence future river-crossing projects.

When the 24-in. line broke in two places at 11 p.m., May 17, where the north bank of the river had been cut back 900 ft. by a 15-mile-per-hour current which had risen from a normal depth of 4 ft. to a flood depth of 30 ft., WEP was confronted with the need of laying a temporary bypass across the Rock Island railroad bridge 3½ miles upstream. Two days after the break, decisions were reached and arrangements completed for laying such a bypass with 9 miles of 20-in. pipe which had been destined for the WEP products line. Relaying and safeguarding a permanent 24-in. line across the river bed had to wait until flood water subsided.

This is probably the first time that an oil pipe line has been laid across a railroad bridge. For carrying on the work special provisions were required. In order that the pipe be placed in a position where it would not interfere with certain rods used in operations of the railroad, wooden supports were built to hold the pipe above the steel plates at the side of the bridge. These supports were built up with four layers of 4 by 6-in. blocks of wood, braced by three heavy boards which fanned out and were nailed to ends of railroad ties. Security of the pipe was safeguarded by two strands of ⅝-in. wire line wrapped around the pipe and tied to vertical and horizontal members of the bridge structure. To provide footing for the welders, a temporary

Suction dredge (left) with 14-in. pump, which moved approximately 1,000,000 cu. yd. of sand and the pipe barge with ramp (right) used in connection with relaying the 24-in. line and laying the 20-in. line across the Arkansas River

wooden platform was built the entire length of the bridge at the side where the pipe line was constructed. All of the wood construction was handled by two carpenters with a large number of helpers.

Welding of the pipe across the bridge was carried on with frequen interruptions since 50 to 60 trains daily passed over the tracks. Traffic had been increased by washouts of other railroad bridges in the region About the longest time that work could be done continuously was 40 minutes. Since all equipment for the job was mounted on flat cars it had to be withdrawn whenever railroad trains crossed the bridge. Frequently this meant delays of half an hour to an hour at a time. It took about two days to complete the section of the line at the bridge.

For laying eight car loads of pipe across the bridge, one flat car carried dragline equipment for lifting pipe from the cars and for holding it during lining up and welding while another car carried welding equipment. It was necessary to remove the "A" frame from the dragline because of the lack of space under the overhead girders of the bridge. Consequently the dragline boom was operated in a cramped position and cables went almost straight back to the hoist. It was necessary to remove the top layer of pipe from each car.

All night operations were conducted with abundant illumination furnished by 300-watt bulbs installed at 50-ft. intervals for the duration of the job.

Before laying of pipe started on the bridge, two other pipe gangs, using the stovepipe method, one on each side of the river, were well under way with welding the line ahead of ditches dug by about 100 laborers. It was not practicable to operate ditching machines.

A unique feature of the project was the manner in which the pipe was laid diagonally across a levee on the north side of the river near the bridge. The pipe extended at a gradual slope for considerable distances along the banks of the levee on both sides of the point where it crossed diagonally over the top. No bending of the pipe was required. Where necessary, pipe was supported by trestles of crossties on the banks of the levee. Heavy concrete anchors were placed over the pipe on low ground where there was danger of flooding.

In some places where pipe was laid over ground covered with as much as 2 ft. of water for distances of several hundred feet, welding machines were carried on tractors.

Ten road crossing crews were working at the highways and four railroad systems. At one place boring had to be done under two railroads and a highway located close together.

Pipe Laid Ahead of Survey

Right-of-way was staked on the ground without reference to a map. Changes of route were necessary in certain parts where pipe had to be laid ahead of the surveyors. There was no time to buy right-of-way until after the 9-mile, 20-in. bypass was completed. Because of the emergency situation, land owners assumed that the line must be laid. The only sign of interference came from two young policemen, soon quieted by an old pipeliner saying they were "not wearing the right kind of stars to tell this outfit what to do." They knew they were on an important war job. Some day we may learn what the crude oil passing through the big-inch line contributed to the success of the Mediterranean campaign of the United Nations.

The bypass was completed at 7 p.m., May 24, 6 days and 21 hours after the line broke. Since actual construction started at 5 p.m., May 20, the work itself was really completed in only 4 days and 2 hours.

Within a few hours after the last weld was made pressure was raised in the system from Longview, Tex., and the flow of oil was resumed. The 20-in. bypass will remain in place for the duration of the war as a spare line which might be used in case of flood damage to either the 24-in. crude-oil line or the 20-in. products line. Since the railroad bridge is a drawbridge, arrangements must be made with Army engineers for permission to leave the line on the bridge in peace time. To facilitate the opening of the bridge for river navigation, it may be necessary to install what is referred to as spool equipment. If WEP is required to remove the 20-in. line from the bridge, it is believed that a large diameter auxiliary line will be laid across the river in the vicinity of the 24-in. crude-oil line

Left: Operations July 12 near the start of repairing the 24-in. line. Dredge in the distance is uncovering pipe to be raised from the river. The river loop was moved upstream. Derrick barge in the foreground operating with a clam shell is digging channel to be used by barges coming down stream for the contractor. Photograph was taken from north bank of river looking directly across to south bank. Above: Photograph taken August 16 looking east downstream from a point near the channel where derrick barge was located when photograph was taken July 12. Comparison of two photographs shows the large sand bars in the foreground and in the distance have been built up in a month by the suction dredge.

and the 20-in. products line.

Much credit is given to J. D. Farrington, chief executive, Rock Island Lines, for his ready cooperation in making the bridge quickly available for the bypass. Official commendation has been given to B. E. Hull, vice president and general manager; A. N. Horne, vice president and assistant general manager; Oscar Wolfe, chief engineer, and Oscar R. Burden, general superintendent of WEP, for their efforts in meeting the demands of the emergency.

Construction of the 20-in. bypass, as well as the relaying of the 24-in line across the river and the laying of the crossing for the 20-in. products line, was handled by Williams Brothers Corp. Immediately in charge of the details of building the 9-mile, 20-in. bypass was H. L. (Red) Davis, superintendent. Guy S. Connors, vice president and general superintendent, directed the undertaking; associated with him in this was David R. Williams, vice president.

In discussing the big job of relaying the 24-in. line so that it would be safely located, a review of the bare facts of the dredging done hardly conveys an adequate conception of the magnitude of the sand moving operations. These included the shifting of about 1,000,000 cu. yd. of sand to accomplish several different purposes. One of these was the creation of a huge sand bar placed downstream so as to divert the river current in the 3,200-ft. wide river bed from the north bank to the south bank where it originally flowed before the May flood had increased the width of the river by a third. To bring barges for the contractor down the river to the main part of the work, a channel had to be maintained.

In order to insure that the pipe would not be damaged by a possible future erosion of the north bank more than 6,200 ft. of river pipe were laid 12 ft. below the low-water level, not only across 3,500-ft. width of the river but also for a distance of 2,000 ft. from the north bank and for a distance of 700 ft. from the south bank. These operations of digging inland into both banks of the river had the appearance of excavating for a canal. Much preliminary work was done by drag lines operating on the ground. Digging was completed by suction dredge which floated as it dug ahead in making the big ditches, with a width at the bottom of 25-ft. to accomodate 20-in. and 24-in. lines, placed about 15 ft. apart.

The suction dredge on the job had a 14-in. centrifugal pump, capable of moving 6,000 to 7,500 yd. daily. To insure that the pipe would be 12 ft. below the low-water level it was necessary to dig down 4 ft. to 16 ft. below the river bed.

After the break occurred, a large amount of pipe in the river was removed. Coating, wrapping and wooden slats were applied to insure protection according to the standards of the project's specifications. Methods used for laying pipe across wide rivers from ramp barges were described in The Oil and Gas Journal, May 13, page 41, and August 26, page 63.

Because of the shallowness of the water, it was not necessary to support the pipe by derrick barges during the laying process. In relaying the pipe, the slack loop in the river line has been placed further upstream than that of the original line.

After the line was laid, dredging continued for a month for removing sand near the upstream side of the pipe so that the line might be lowered to the desired depth.

The undertaking for removing pipe from the river, dredging and relaying altogether took about 3 months. The May 17 flood is regarded as the worst in 16 years.

In discussing the situation, executives have emphasized the point that damage to the 24-in. line had not occurred in the pipe laid across the original river bed but in a section exposed by washing away of the north bank for several hundred feet. By laying pipe according to the present program with standard river crossing protection for considerable distances inland on both sides of the river, the 24-in. and 20-in. lines have been safeguarded against any flood conditions which may be expected.

Oil-Field Flooding

(Continued from page 52)

would be raised to the surface, readings taken, the valve adjusted and then lowered into position. The packer would be set and cemented just above the sand. In the case of a gas sand or other too permeable top streak, the packer would be omitted and the tubing would have a perforated section in the lower part of the shot hole, which would be filled with gravel to a point just above the perforations. Cement would be added in quantity sufficient to fill up several feet of the open hole. This whole assembly would result in a closed system protecting the inflowing water from any contact with air and so would prevent the oxidation of its iron content (Fig. 10). The flooding wells in accidental floods have never been plugged by iron compounds from upper waters because the accidental method results in a similar closed system.

If it were desired to raise the brine to the surface in order to increase the input pressure on the oil sand by means of pumps, it could be air-jetted, chemically treated, filtered and pumped back through unperforated tubing under any desired pressure in the ordinary flooding technique.

Conclusions

By following the method described and illustrated above, flooding costs would be largely independent of depth, with the result that installations could be made in the rich deep southern areas as quickly and far more profitably than in the light shallow northern parts of the old fields. Flooding would be comparable in cost to gas repressuring.

The five-spot patterns would be nearly symmetrical, and the distances from water well to water well would be shorter than they are in the Parker and Patoka floods of the Bradford type now in operation in Illinois. Permeability information which was formerly obtained from cores taken from newly drilled wells would be provided by cores taken by directional drilling below the casing of old wells or by the measurement of fluids forced into the old wells themselves—which is really a full-sized application of the laboratory method. Selection of property favorable for flooding on the basis of oil content would be determined by actual past oil production, the water content of the sand would be indicated by the past and present water-oil ratios. Little financial risk would be involved because much of the production is now in the submarginal class, and relatively little new expense would be involved. The time required to start the actual flooding operation would be reduced to that required to caliper, directional core, gun-perforate the casing opposite the water sand, run and cement the packer, and set the meter and valve, well by well. All of this would be but a small fraction of the time required to plug all the old wells, drill the entire new pattern, find and drill a fresh water supply, and erect and put into operation a water preparation and pumping system. Application of a faster method is of wartime importance.

The writer wishes to thank William S. Corwin, Richard M. Haskell, R. J. Sullivan and Paul Phillippi for information and Alfred H. Bell, Carl A. Bays, Charles W. Carter and William H. Easton of the State Geological Survey for help in preparing the material.

BOOK REVIEW

1943 A.S.T.M. STANDARDS ON STEEL PIPING MATERIALS. Prepared by Committee A-1 on Steel. Published by American Society of Testing Materials, 260 S. Broad St., Philadelphia 2, Pa. 255 pp. $1.75.

This edition of the compilation of all the specifications issued by the A.S.T.M. covering steel piping materials includes 44 standards and also provides 25 emergency alternate provisions that have been issued to aid in expediting procurement.

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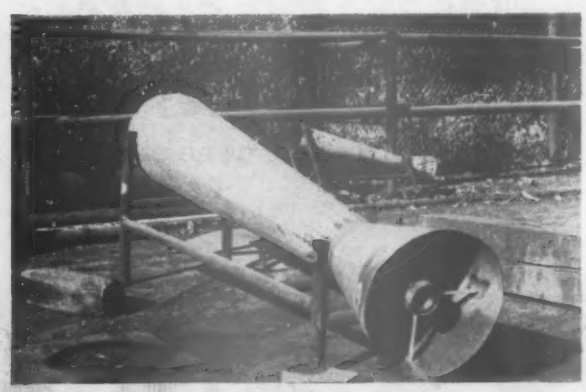
PLANT PRACTICES

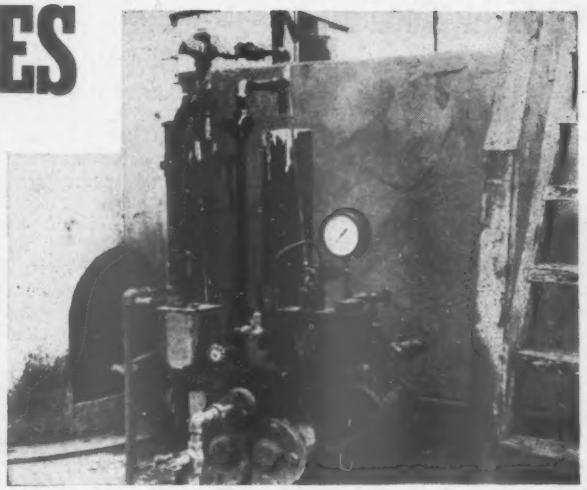
Half-Soled Pipe

ON an old vacuum line, it was noticed that only the lower half was being worn thin and upon study of existing conditions it was concluded that this deterioration was due to internal erosion. At the vacuum pump some rust was pushed into the line and at various leaks some sand was sucked into the pipe line. The erosion was manifest at a steep incline where the condensed water and gasoline mixed with the rust and sand would surge back and forth, thereby wearing the inside of the pipe by abrasion. It was impractical to replace by welding or couplings this portion of the line so the idea of half-soling the line was decided upon. This simply consisted of cutting a piece of pipe (the same size as the one to be repaired) longitudinally, spreading it some and welding it to the lower half of the pipe.

Blending Venturi

BECAUSE of the inability of manufacturers to deliver equipment designed for rapid mixing of gasoline, a venturi nozzle is being employed for this purpose. It is entirely plant constructed with the exception of the nozzle fitted into suction bracket. The sheet metal entering into its construction is shaped without a sheet metal bender. Workmen using a straight edge of steel, shaped the funnel which is finished with welded seams. The mixer is carried on a support made of pipe, and has a pan beneath the inlet end to prevent disturbing particles of scale and bottom settlings on the floor of tank.





Double Lubricator Bracket

IF a proportioning pump is to be operated with the flow of chemicals entering a commodity handled by a reciprocating pump, the operating lever of both the steam lubricator and the chemical feeder can be connected to the cross stand of the pump at a common point. Brackets attached to the steam chest of the pump form a foundation for the pumps.

Gage Glass Shield

TO protect a gage glass at the extreme end of a horizontal washer-mixer cylinder in Bareco's Wichita, Kans., refinery the solution of the problem proved to be simple enough. A longitudinal half of a section of 2-in. pipe was cut out, just long enough to fit between the valve stems at each end of the gage glass. Holes were drilled at the four corners of this section, heavy wire was passed through these holes and the half-cylinder was drawn tight at each end against the packing gland nut on the valves above and below. This shield is rigid enough in place to prevent any hard object or a blow from reaching the glass, yet can be removed instantly when needed. The gage may be read when looking from the side, instantly and easily, it not being necessary to remove or move shield for routine reading.

REFUELERS

These OCS Pumpers are on the job . hard at work . . . 24 hours a day . . producing the oil to keep Uncle Sam's army flying and rolling to victory. And, when victory is won, they'll still be on the job . . . hard at work . . . 24 hours a day . . . producing the oil to keep a Democratic World flying and rolling again. The fine design, the quality materials and the service behind these remarkable units will see to that.

Thanks to the faith which our government has placed in our ability to produce war materials, delivery of pumping units at this time is naturally slow, but the Oil Industry will bear with us until we can again produce normally for a peaceful world.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

References on Petroleum Pilot Plants

I would appreciate very much information on whether there has been published, or is contemplated for publication, a book on the special subject "Pilot Plant Design and Operation in the Petroleum Industry."—L. V.

To our knowledge no such book has been written or published. The wide scope of the petroleum industry would require an extremely extensive book. It is suggested that pilot plants and their operation can be best studied in connection with each project at the moment that work on the problem is initiated. With a specific problem in front of you, it would be a simple matter to check the technical literature on the subject and to find many equipments and even types of equipment that have been employed by other experimenters.

The nearest thing to a textbook on pilot plant work is "Chemical Engineering Laboratory Equipment, Design, . . . ," by Zimmerman and Larin, Ind. Research Service, Dover, N. H., but obviously such a manual treats of some operations that are not closely related to petroleum processing.

If the types of laboratory equipment being considered are limited to embrace only those equipments that are used in evaluating the yields of products from petroleum stocks, the following list of references may be useful:

1. Stanfield, K. E., Some Asphalts From Oregon Basin (Wyoming) Crude Oil, Bur. Mines, R.I. 3435, Mar. 1939.

2. Cody & Luntz, Laboratory Evaluation of Petroleum Products, The Oil and Gas Journal, p. 184, Jan. 30, 1941.

3. Mithoff et al, California Crude Oils, The Oil and Gas Journal, p. 81, Nov. 6, 1941.

4. Nelson, W. L., Petroleum Refinery Engineering, second edition Chaps. 6 and 7, McGraw-Hill Book Co., Inc., New York, 1941.

5. Gary & Ward, A Modern Experimental Cracking Unit, Refiner, June 1933, p. 212.

6. Scheumann & Stewart, Laboratory Apparatus for Evaluating Crude, The Oil and Gas Journal, p. 74, May 16, 1935.

7. Smith, H. G., Experimental Solvent Ext. Tower Unit, The Oil and Gas Journal, p. 44, June 3, 1937.

8. Sager, F., Commercial Acid Treating Reproduced in Lab., Refiner, p. 57, Feb. 1938.

9. Clark, et al, A Laboratory-Size Leaf-Type Pressure Filter, Ind. Eng. Chem., Vol. 12, p. 755, 1940.

Determining the Source Of Fuel Oils

Recently I have been called upon to identify the source of various fuel oils. Can you suggest how to go about this?—T. C. G.

What is desired is not altogether clear from the question. It is presumed that what it is desired to learn is whether the fuel oil is a straightrun variety, what crude oil it might have come from, or whether it is made by some synthetic process involving coal.

Pure straightrun fuels can be identified with great confidence by their very high viscosity. Thus, a 20 A.P.I. straightrun residue will have about the same viscosity as a 5 A.P.I. cracked residue. Although exact values cannot be given, somewhat the same situation exists with respect to other fuel oils, such as those resulting by the distillation of coal and oil shale which both have extremely low A.P.I. gravities. In a general way the gravity of pure cracked fuel oils is about 15 A.P.I. units lower than for straightrun fuel oils. Thus, the viscosities of cracked and straightrun materials are about as follows (Petroleum Refinery Engineering, page 302, second edition, McGraw-Hill Book Co., Inc., New York):

FUROL VISCOSITY AT 122° F.

A.P.I.	Cracked	Straightrun
2.5	1,000	....
5.0	150	....
7.0	*40	....
17.5	....	700
20.0	....	300
27.0	....	*40

*Approximately.

A 10 A.P.I. straightrun product is a solid asphalt.

The gravity of hydrogenated products may possibly be an exception to the gravity relationships given in the previous paragraph. Difficulty would also arise when dealing with mixtures. Most fuel oils are a mixture of straightrun and cracked materials and the gravities of these mixtures will range between that of pure cracked materials and pure straightrun materials.

Experiments with samples of fuel oils produced by various processes should be conducted, but if such a study is not possible, the following measuring sticks may prove of value.

Characterization factor.—This is defined as the cube root of the absolute boiling point (°F.) divided by the specific gravity (60° F.). The characterization factors of fuel oils of various sources are somewhat as follows:

Straightrun intermediate or mixed-base crude oil	11.5-11.9
Straightrun naphthene or asphalt-base crude oil	11.0-11.5
Straightrun aromatic-base crude oil	10.8-11.3
Cracked	10.5-11.0
Coal products by hydrogenation	9.0-10.0
Coal tar residues (not hydrogenated)	8.5- 9.5

The term aromatic-base crude oils used in this tabulation is not a common one. It is used to designate those crude oils from Borneo, Burma, Persia, Rumania and Mexia which produce gasolines containing more than 10 per cent of aromatic hydrocarbons.

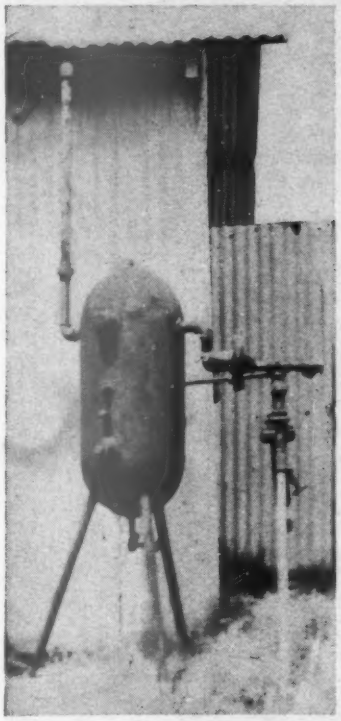
Aniline function.—This is defined as the critical solution temperature, degrees Fahrenheit, of the material in aniline (nearly same as aniline point) divided by the absolute boiling point, degrees Fahrenheit, and multiplied by the molecular weight. It is recommended that Reports of Investigations R.I. 3721, October 1943 of the Bureau of Mines entitled "Aniline Points of Hydrocarbons," by John S. Ball, be consulted. The aniline function of cracked materials and the products of coal decomposition should be definitely lower than for straightrun fuel oils. Most approximately the aniline functions should range about as follows:

Coal-tar products	140-190
Straightrun fuel oils	185-225

Solubility. — The solubility of straightrun, cracked, and coal-tar fuel oils is different in such solvents as petroleum naphtha, carbon disulfide and chloroform. Such tests are used extensively in connection with asphalts and bituminous materials.

Other measuring sticks, such as viscosity-index, viscosity-gravity constant, etc., have not been applied widely to fuel oils.

OPERATING IDEAS



Gas Scrubber

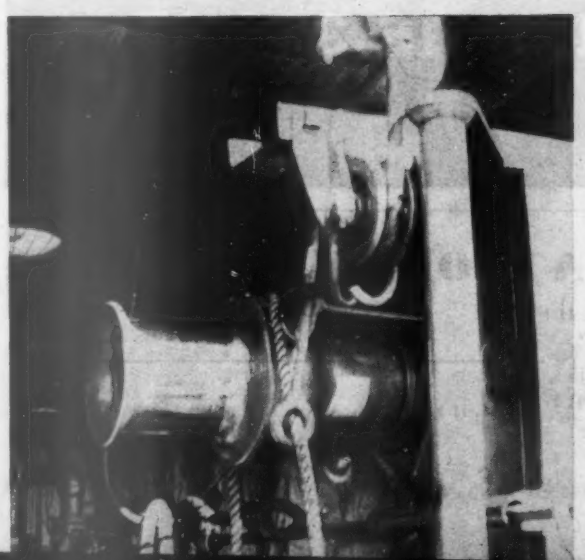
TO insure a clean flow of fuel from the field lines to the gas engine at a pumping well, some sort of a scrubber is employed. Now that many installations must be made by improvising, one company separated from the junk pile such liquid-level float cases which could not be used again for handling fluids. The openings for fluid travel on the side of the cases are plugged with cast-iron plugs and a flat plate and gasket bolted over the float-arm opening. A goose-neck nipple welded through the side of the case on the inlet side directs the flow of gas downward for more effective separation of condensate while the opposite side is fitted with a similar nipple to which the piping is attached leading to the gas-engine mixing valve. A small-diameter nipple in the bottom fitted with a gate valve permits draining of sediment and liquid as frequently as necessary. The entire assembly is mounted on a pipe tripod.

Filling Pressure Grease-Gun Barrel

TO prevent pressure-gun lubricant from sticking to the exterior of the barrel when refilling, follow these simple steps. First, proceed in the usual manner by removing the screw end, push the plunger down until the residual grease or the leathers are flush with the rim of the barrel, then stick the open end of the gun in a can of diesel fuel or kerosene, allowing the liquid to extend up almost to the knurled hand-hold section. Immediately place the gun in the can, or drum, of lubricant and fill by pulling up on the plunger handle. When removing the end from the lubricant, there will be no mass of heavy grease to wipe away. This saves wiping rags and lubricant, and the man filling and using the gun can keep his hands, gloves and clothing much cleaner.

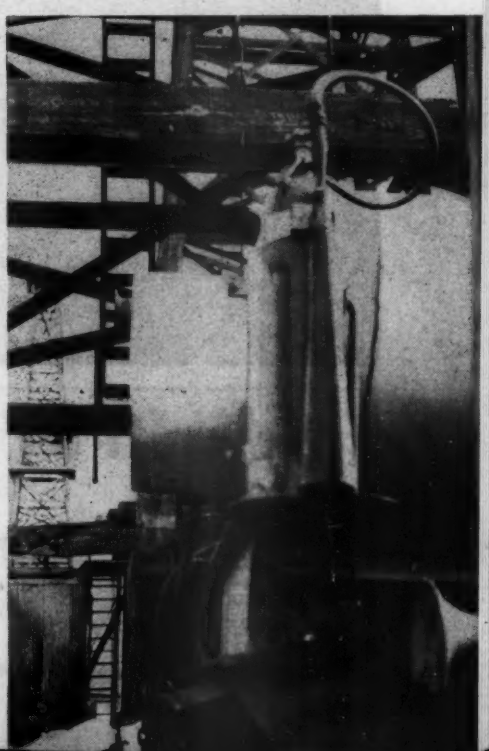
Derrick-Line Saddle

TO prevent damage to the derrick and cathead lines by wearing against the cathead, a saddle can be made at little expense which is bolted to brackets attached to the frame of the draw works. It is made by shaping a piece of sheet metal to follow the contour of the cathead just inside the flange, and finished by rounding the ends and sides with a rolled bead. The width of the saddle can be formed to suit conditions, but should not be wider than enough to hold two manila lines conveniently. The brackets are made of sucker rod, or any round iron strong enough to support the saddle without bending. Holes can be drilled in the frame, or sheathing, of the draw works to insert the brackets.



Holder for Fire Extinguisher

WHEN the fire extinguisher is mounted on a retainer without clips or unhandy locking fixtures, its use can be expedited and the fire put out more quickly. This operator built a holder, which is connected to well-service units, by welding a flat, circular piece of light metal to the frame of the wire-line drum. A shallow ring is fastened to the flat supporting member so that long, stiff fingers can be riveted or welded at three equidistant points. These fingers are shaped to lean towards each other when the extinguisher is removed so that sufficient pressure is exerted to retain the equipment without causing shifting when on rough roads. A strong jerk removes the extinguisher from the holder.



Most of the figures that tell the story of Wichita's growth and what it means to the war effort remain a military secret . . . They are blacked out for the duration. But here is one figure we can give you.

Total resources
THE FOURTH NATIONAL BANK
IN WICHITA

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Cracking Technology—No. 9

Reactions of Sulfur Compounds During Cracking

*by C. R. Wagner**

The reactions of sulfur compounds in cracking charge stocks vary with the cracking conditions and the nature of the sulfur compounds. Mercaptan and straight-chain sulfur products are broken down to H_2S and other degradation products. Thiophene sulfur as found in oils such as California crudes give high-sulfur distillates, less concentration of sulfur in the heavy bottoms. Nitrogen organics give pyrrole derivatives. Oxygenated hydrocarbons form phenols, naphthenic and fatty acids, etc.

THE behavior of sulfur compounds during the cracking reaction is of more than academic interest to the refiner. Some work on the reactions of sulfur compounds at high temperatures has been published.[1,2,3] Most of this has been concerned with the simpler compounds which may exist in gasoline, but which certainly do not exist in gas oil or most stocks that are charged to a cracking coil. It seems fairly certain that high-molecular-weight mercaptans are the most objectionable sulfur compounds found in stocks charged to cracking units, because they split off H_2S rather easily. This H_2S as it is formed is very active, and there is rapid corrosion of steel tubes and fractionating equipment on cracking units handling stocks containing mercaptans. This corrosion can be minimized by the use of high-chromium-content alloys in those parts of the apparatus affected. Although expensive, they are more satisfactory for many purposes than the introduction of hydrated lime[4] into the charging stock. The calcium sulfide formed must be filtered out of the fuel, if b.s. and w. troubles with customers are to be avoided, and the filtration problem is not easily solved. The depilatory effect of calcium sulfide makes the filter cake very disagreeable to handle.

It is worth remembering that only a part of the sulfur appears as H_2S in the products of the cracking reaction. The sulfur compounds present in the charging stock seem to be readily polymerized under the cracking conditions and a large part of them concentrates in the fuel oil residue. In Table 1 are given the results of a number of pressure distillations at 95 lb. per sq. in., using different types of charging stock to determine the distribution of sulfur among the products. No attempt was made to ascertain the types of sulfur compounds actually present.

These figures are particularly interesting when compared with the results of a modern refinery operation. When charging Illinois crude petroleum containing 0.23 per cent sulfur to a combination high-pressure cracking unit and producing gasoline, furnace oil and 11.0-gravity fuel oil the sulfur balance in a modern plant is as follows:

	Volume per cent of crude	Pounds sulfur in product per 100 lb. sulfur in crude oil
Gasoline	56.0	5.5
Furnace oil	6.3	1.6
Fuel oil	27.8	65.6
Gas (by difference)	7.9	27.3

TABLE 1

Description of charging stock	Vol. per cent of dist. prod.	Per cent S. in charge	Pounds sulfur in products per 100 lb. sulfur in chge. Pressure Dist.	Pressure tar	Gas
Bottoms from rerunning acid-treated kerosine distillate. Exptl. run	49.0	0.83	18.2	54.4	27.4
Mixture fresh gas oil and recyle stock. Plant operation	50.0	0.44	7.9	72.7	19.4
Refractory recycle stock. Experimental run	50.3	0.29	21.3	77.5	1.2
90% regular charging stock and 10% neutralized acid oil from acid recovery system. Exptl. run	50.5	0.63	12.2	42.8	45.0
70% regular charging stock and 30% neutralized acid oil from acid recovery system. Exptl. run	50.3	0.74	14.9	40.8	44.3

The loss to H_2S is greater in proportion to the sulfur content of the charge than was found at the lower pressure and temperature. The percentage of the total sulfur appearing in the fuel is very much higher also, as would be expected from the more favorable conditions for polymerization.

Certain crude petroleums, California for example, contain a high percentage of the thiophene type of sulfur compounds. Cracking of such stocks produces distillates of relatively high sulfur content and there is less tendency for sulfur to concentrate in the residual fuel oil.

Nitrogen compounds present in crude petroleum are probably very complex. Investigators have identified a number of the porphyrins in some petroleums, and it is probable that they are in most petroleums. These compounds are complex structures, containing four pyrrole nuclei, resulting from the decomposition of chlorophyll and haemoglobin. Distillation and cracking cause splitting and rearrangement of such compounds with the result that ammonia derivatives, as well as the more complex compounds reported by Dr. J. R. Bailey and his associates at the University of Texas, are formed. The author has observed crystals of ammonium salts (probably chloride) around gas leaks on the receiving drums of Burton stills, and at times the pronounced odor of acetamide (CH_3-CO-NH_2) in the receiving house of such units was unmistakable.

PYRROLE

Oxygen compounds in the charging stock to a cracking unit decompose to form phenols, naphthenic acids and more simple fatty acids and aldehydes, as well as some CO, CO_2 and H_2O. Frequently corrosion of gas and water separators and heat exchangers between these separators and the stabilizer may be attributed to such acids rather than to HCl. If the crude petroleum contains considerable naphthenic acids, it will be advisable to check these points in the system frequently to make certain that corrective measures are proving effective. It may not always be desirable to use ammonia as a neutralizing agent for such acids because of the corrosive character of ammonium salts. If caustic is used, care will have to be exercised to prevent building up a layer of alkali on the heat exchanger tubes.

*Consultant in refining technology.

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RELATION OF HEAT REQUIREMENTS TO COSTS OF TREATING CRUDE OIL

OBTAINING clean pipe-line oil at the lowest possible cost is the primary objective of any oil-treating method. During recent years the various treating methods have become more or less standardized, resulting in lower and lower costs per barrel of treated oil. Improved treating methods and development of new chemicals have resulted in much better treating efficiency. Notwithstanding this, treating cost usually is a major item on any production budget and as such receives careful supervision and attention on the part of most operators.

Treating Methods

Of the various treating methods, chemical and thermal treatments, or a combination of the two, are widely used in every oil-producing area. In some instances, chemical treatment alone is not effective, and it is necessary to install treating plants with facilities for heating the emulsified oil. In other areas, the amount of necessary chemical can be greatly reduced by a combination thermal-chemical treatment. Considering this fact, the question usually arises as to the proper method for securing the lowest possible treating cost.

As a general rule, on those leases where chemical is used, the chemical cost accounts for approximately one-half of the total treating cost per barrel of oil. Where thermal treatment is used, installation, labor, repairs, fuel, and depreciation must necessarily be considered in arriving at treating costs.

A cost estimate covering the installation of heating equipment is shown in Table 1. Chemical costs amounted to $0.0212 per barrel of treated oil and were excessive since cost records indicated that the average chemical cost over a large group of wells was approximately $0.005 per barrel of treated oil.

A preliminary investigation indicated that large-scale chemical treatment was impractical unless the oil was heated. Average temperature of the emulsified oil was 80° F. and tests indicated that chemical costs could be reduced to $0.007 per barrel treated oil by maintaining a temperature of 140° F. The production amounted to 320 bbl. of fluid per day with 13 per cent water in the emulsion.

TABLE 1

Investment—heating plant	$2,100
Costs on yearly basis:	
Maintenance—repairs and labor	$40
Fuel—at 6 cents per 1,000 cu. ft	99
Depreciation	210
Total cost per year—heating plant	$349
Cost per barel oil treated (heating only)	$0.0034
Present chemical cost per barrel treated oil	0.0212
Estimated chemical cost with heating plant	0.0070
Estimated savings per year by heating plant	$1,100

Heat Requirements

Table 1 was prepared on the basis of the following method. The necessary B.t.u. to raise 1 bbl. of fluid 1° F. for various oil-water percentages is shown in the accompanying figure. These values shown on the chart were based on a specific heat of 0.5 for oil weighing 300 lb. per bbl. and a specific heat of 1 for water weighing 350 lb. per bbl. As noted from the chart the necessary heat to raise 1 bbl of fluid containing 87 per cent oil, 1° F. amounts to 172 B.t.u. For 320 bbl. per day and a 60° temperature rise the required heat is:

$$172 \times 60 \times 320 = 3{,}300{,}000 \text{ B.t.u. day}$$

This corresponds to a heater with a rated capacity of 137,500 B.t.u. per hour. To ensure some factor of safety and to reduce maintenance costs, the recommended installation provided for a heater with a rated capacity of 275,000 B.t.u. per hour.

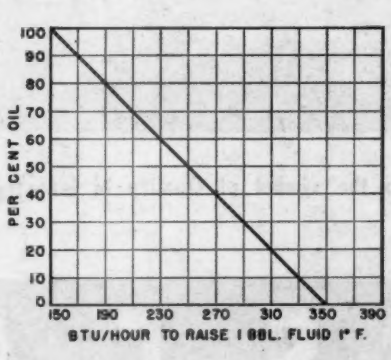

Fig. 1

Fuel Costs

Based on a price of 6 cents per 1,000 cu. ft., 1,200 B.t.u. per cubic foot of gas, and a thermal efficiency of 60 per cent for the heater, the fuel costs would be:

$$3{,}300{,}000 \div 0.6 \times 1{,}200 \times 1{,}000 = \$0.275 \text{ per day}$$

The depreciation charge shown in the table varies considerably with different accounting procedures and methods for arriving at such costs. The estimate also does not show any additional labor charge other than labor for repairs. This item will also vary according to the accounting procedure used for calculating treating costs.

As indicated by Table 1, the installation of heating equipment would effect a savings of approximately $1,100 per year in treating costs. The present example is a somewhat unusual case and in many areas the use of heat or chemical alone might provide the most economical method of treatment.

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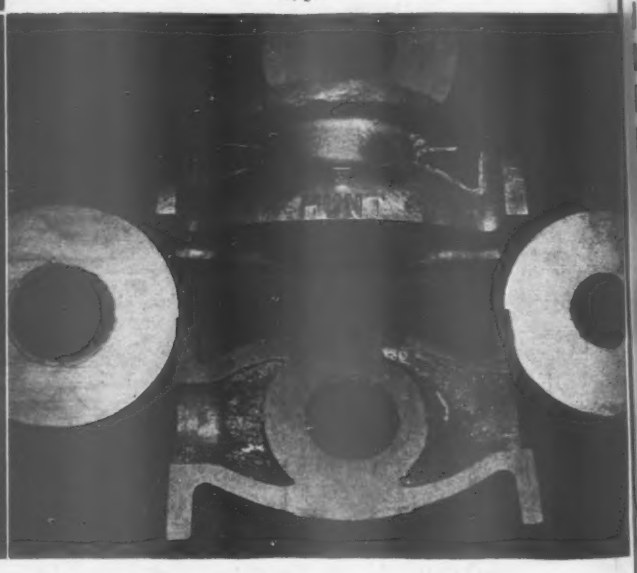

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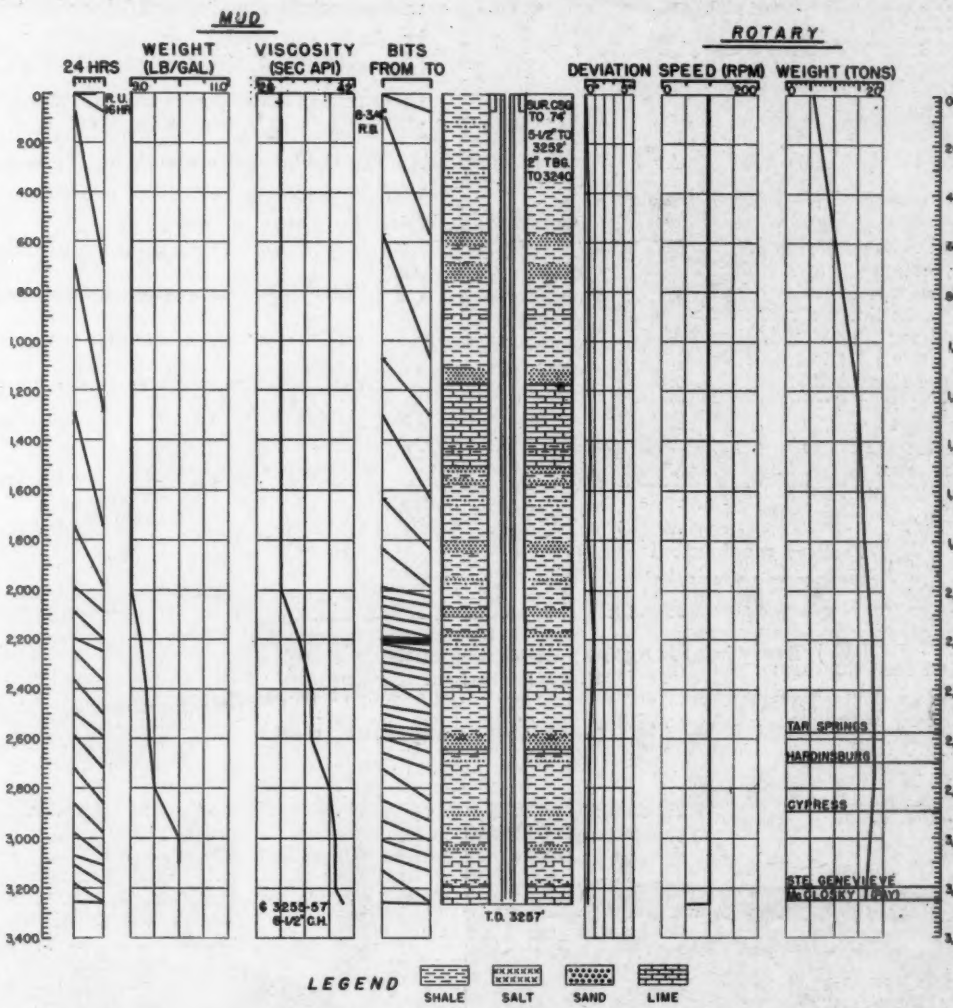

DRILLING DATA

Well elevation, derrick floor	463 ft.
Date started rigging up	8- 4-43
Date completed	8-25-43
Date started drilling rotary	8- 6-43
Date set casing rotary	8-25-43
Total rotary time, days	21⅓
	Hours
W.O.C., surface pipe	18
Logging, 2 (electric)	6
Coring	6
Circulating	9½
Drill-stem test	17
Breaking down pipe and running casing	10
Trips	31
Repairs	35
Shut down	3

BITS USED

Type—	Number	Size (in.)
Rock bit	1	12¾
Rock bit	31	8¾

CORE HEADS USED

Type—	Number	Size (in.)
Hard formation	1	6½

MUD USED

Type—	Amount
Aquagel	2 tons
Knox salt	10 sacks

CASING AND TUBING RECORD

Size (in.)	Weight (lb.)	Depth (ft.)	Cement (sacks)
10¾	32.75	74	50
5½ (o.d.)	14.0	3,252	100
2½ (tubing)	6.5	3,240	50

COMPLETION

Acidizing	2,000 gal.

PRODUCTION TEST

Date	9-8-43
Time flowed, hours	24
Choke (flowed through tubing, no choke)	
Tubing pressure, lb.	20
Casing pressure, lb.	275
Separator pressure, lb.	20
Oil, bbl.	245
Water, bbl.	48
Gas, cu. ft.	100,000
Gravity, °F.	38.6
B.H.P., lb.	1,250
Producing horizon	McClosky lime

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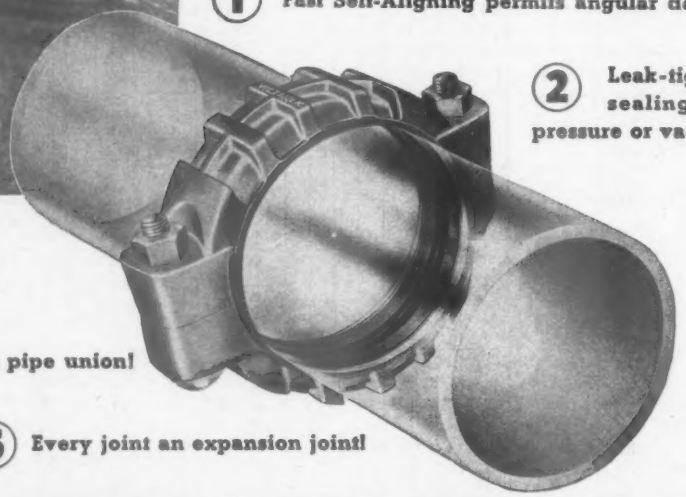

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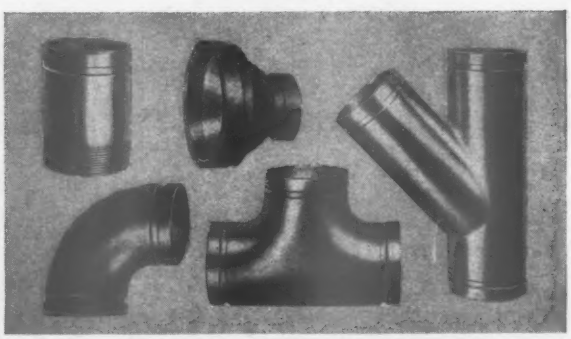

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REFINING

Forms Issued for Refineries Planning to Use Sour Crude

CHICAGO.—With tank-car movement of West Texas sour crude to Mid-Continent refineries now in prospect, C. H. Alberding, director of refining for the Petroleum Administration for War in District 2, has issued forms for use in obtaining approval of such changes or equipment as may be necessary. In his letter to refiners Alberding says many have indicated they would undertake to run some of this crude if certain alloy materials could be obtained.

"Although the alloy picture appears to be easing," says the letter, "not much alloy equipment of the kind needed to handle sour crude is available for immediate delivery. For this reason it is necessary that action be taken at once. It would be best to adhere to simple standards. Tubular goods will probably be the most in demand. If still-tube requirements are restricted to 4-6 per cent chromium, ½ per cent moly with plain ends, delivery will be made in the minimum time as compared to alloys of a special nature. Upset ends require extra time for rolling and should be avoided if possible."

Cooperative Purchases Coffeyville, Kans., Plant

NORTH KANSAS CITY, Mo.—The Cooperative Refinery Association, with headquarters here, has agreed to purchase the Coffeyville, Kans., properties of National Refining Co., it was announced this week by Howard A. Cowden, president of the cooperative.

Cooperative Refinery Association (C.R.A.) plans to take over January 1 the following facilities:

A gasoline refinery using 13,500 bbl. of crude oil a day at capacity. Its annual output will be approximately 81,000,000 gal. of refined fuels.

A lubricating-oil plant where bright stocks and neutrals and finished oils are made at the rate of 10,000,000 gal. a year. It will be the world's first cooperatively owned plant of its kind. A furfural plant which is under construction now and will cost when completed approximately $165,000.

Defense Plant Corp., an agency of the federal Government, is constructing an aviation-gasoline unit adjacent to the Coffeyville plant, which C.R.A. expects to operate. It will be in operation about February 1, 1944.

Included in the purchase also are 269 oil wells and 768 miles of gathering and trunk pipe lines which connect these wells, and the wells of other crude-oil producers, to the refinery. In addition there are 104,408 acres of undeveloped leases in Illinois, Kansas, Oklahoma, Texas and New Mexico. One well is drilling in Illinois now, and it is probable that a further drilling program will be undertaken shortly.

These facilities, plus a number of motor transports and substantial inventory will bring the total purchase price to more than $4,000,000.

Located on the Great Lakes pipe line, which runs from Cushing, Okla., through Kansas City to Des Moines, Omaha, the Twin Cities and Chicago, the Coffeyville refinery will be in position to serve Missouri and Iowa advantageously on a direct basis.

The Cooperative Refinery Association now owns a 1,500-bbl. refinery at Scottsbluff, Neb., a 3,400-bbl. refinery at Phillipsburg, Kans., and an interest in the 17,500-bbl. refinery at McPherson, Kans., which was purchased in July, this year, by five regional cooperative wholesales. C.R.A. is the refining subsidiary of Consumers Cooperative Association, North Kansas City, Mo., a cooperative wholesale which supplies 749 member associations in Kansas, Oklahoma, Colorado, Utah, Wyoming, North and South Dakota, Nebraska, Iowa and Missouri.

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William Naden, general superintendent; Herman Gunter, catalytic-cracking plant foreman, and Henry G. McBurney, in charge of crude-oil distillation, cracking and alkylation units and their auxiliaries for Standard Oil Co. of New Jersey at the Baltimore, Md., refinery. An article describing conversion of the Baltimore plant to war service appeared in the November 25 Journal, Engineering and Operating Section

Addition of the Coffeyville facilities makes C.R.A. one of the largest, if not the largest, independent refiner in the United States.

Other facilities of National Refining Co., including its refinery at Cleveland, Ohio, recently were acquired by a limited partnership as reported on page 84 of the November 25 Journal.

New Chemical Plant to Be Operated on Petroleum

CUMBERLAND, Md.—The contract for the construction of the Celanese Corp. of America's new $5,000,000 chemical plant near Corpus Christi at Bishop, Nueces County, Texas, has been awarded to the Gasoline Plant Construction Co. of Houston, Tex.

The Gasoline Plant Construction organization has already broken ground for the new plant on the site of about 300 acres purchased by Celanese some time ago.

The chemical research and engineering phase of the Celanese company's expanded program, conducted here in almost complete obscurity for nearly a decade under the direction of Joseph E. Bludworth, chemical engineer in charge research and development, will gain new impetus as a result of the production of chemicals from petroleum in Texas. The Celanese research division, which has worked out processes for a variety of chemicals, has expanded under Bludworth from a group of only a few chemists to more than 100 specialists. Some of these experts are already in Texas to assist in preparations for construction of the new project, and it is expected many others of the personnel will be transferred to the Texas plant as construction progresses.

Approval for plant construction indicates that government officials in Washington were convinced of the company's ability to produce needed chemicals from petroleum hydrocarbons.

The site near Corpus Christi was selected, because it proved to be the most logical from the standpoints of raw material, climate, transportation and other facilities.

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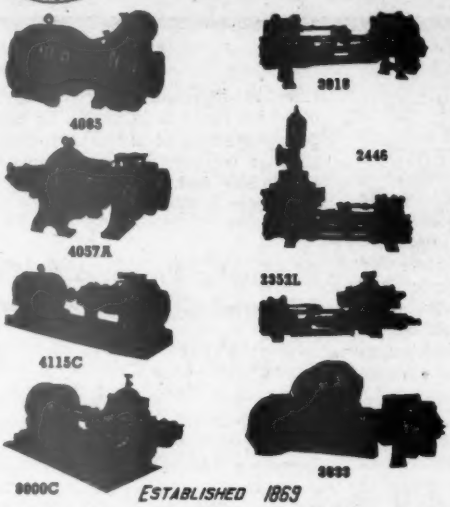

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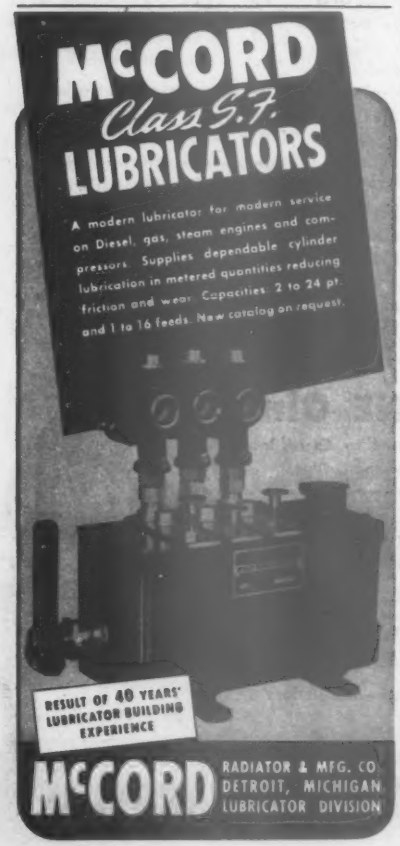

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PIPE LINES

WEP Stops Norris City Tank-Car Shipments

Tank-car shipments of crude oil from the Norris City, Ill., of War Emergency Pipelines, Inc., ceased last week since throughput of the eastern extension of the 24-in. line has been increased to a daily rate close to its rated capacity of 300,000 bbl., which can be maintained fairly consistently in spite of numerous adjustments required in putting certain recently completed stations into operation. At present it appears unlikely that Norris City tank-car shipments will be resumed either for moving crude from the 24-in. line or products from the 20-in. line, after the latter system has been put in operation. It is anticipated that products pumped to Norris City will proceed eastward to fill the line to the coast.

For completing the eastern leg of the 20-in. line only 8 miles remains to be laid in the vicinity of Somerset, Ohio. Testing of the Beaumont, Tex.-Norris City, Ill., line is under way at 800 lb. pressure.

PAW has scheduled deliveries of crude oil to the WEP 24-in. line at Longview, Tex., for December amounting to 9,517,000 bbl., averaging approximately 317,000 bbl. daily. Of the total amount, 4,650,000 bbl. will come from East Texas, 1,550,000 bbl. from Southwest Texas and 3,317,000 bbl. from West Texas.

Pipe Reaches All Gangs on Stanolind 16-In. Line

Each of the six gangs engaged in laying Stanolind Pipe Line Co.'s 385-mile 16-in. Slaughter, Tex.,-Drumright, Okla., crude-oil line has received sufficient pipe for proceeding with construction. Actual pipe laying has been started by two main-line gangs in Oklahoma and by the river gang. Early this week 125 miles of pipe was scheduled for shipment from the mills and 82 miles had been received along the route.

WPB has approved a plan by which the Stanolind company and Magnolia Pipe Line Co. will utilize an 8-in. line of Magnolia extending southward from the Slaughter pool. According to the arrangement, 10 miles of 8-in. line will be laid east from the Wasson pool to deliver into the Magnolia line, to facilitate movement of 16,000 bbl. daily northward to the first pump station of the Stanolind 16-in. line as well as to handle movement of 20,000 bbl. daily southward for Magnolia.

Magnolia Progresses With Midland-Corsicana Project

In the construction of Magnolia Pipe Line Co.'s Midland-Corsicana, Tex., 12-in. crude-oil line, work is reported to be well under way near Big Spring and in the Corsicana-Brazos River section.

Wilson Appointed Chief Of PAW Transportation

G. A. WILSON

George A. Wilson, appointed last week to succeed J. R. Parten as director of the transportation division, Petroleum Administration for War, served as assistant director since he came to the organization from Standard Oil Co. of Louisiana in April 1942.

He was born at Mansfield, La., where he attended public schools. In 1929 he was graduated from Centenary College and he received his law degree from Tulane University in 1933.

During the years 1933-1940, Wilson maintained a private law practice in

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New Orleans as a specialist and consultant on oil and gas, and during this period he served part time as professor of oil and gas law at the Tulane University Law School. In 1940 he was appointed general counsel to the Louisiana Conservation Commission and to the State Department of Minerals. He aided in the reorganization of these two agencies. He joined the Standard of Louisiana in July 1941, and also served as a director of the Mid-Continent Oil and Gas Association up to the time he joined the staff of PAW.

Wilson had been executive officer of the PAW transportation division since coming to the agency, and as such had worked closely with the retiring director on all phases of oil transportation.

Ajax Pipe Line Reduces Tariff

A reduction of 2 cents per barrel in transportation rates of Ajax Pipe Line Corp. became effective December 1, 1943, for shipments from Glenn pool, Oklahoma. The new rates to delivery points will be as follows in cents per barrel:

Hartford, Ill. (near Wood River), 23 cents; Martinsville, Ill., 28; Rock Island, Ind., 33; Lima, Ohio, 35½; Findlay, Ohio, 37; Bay Shore, Ohio, 38; Heath, Ohio, Cleveland, Ohio, the international boundary (north of Toledo, Mich.), 43; Cabin Creek, Falling Rock and South Charleston, W. Va., 44; Bayway, N. J., Routes 1 and 3, 55; Route 5, 62½, and Route 6, 57 cents.

Gasoline Pipe Line Flow Nearly Doubled

Pipe line transportation of gasoline in September was nearly twice as great as that of a year earlier, and showed an increase from August. Movement of gasoline in pipe lines in the first 9 months of 1943 registered a considerable increase from the corresponding 1942 period.

Calculations from Bureau of Mines figures indicate that the volume of gasoline transportation by pipe line was approximately 36 per cent of the total production of motor fuel in September, whereas a year earlier the pipe-line gasoline movement was only about 21 per cent in volume of the somewhat smaller total of motor-fuel production.

Motor fuel turned into pipe lines in the first 9 months of 1943 totaled 147,664,000 bbl., against 89,883,000 bbl. in the corresponding 1942 period, an increase of 64.28 per cent.

Total motor fuel turned into lines in September was 19,986,000 bbl. compared with 19,278,000 bbl. in August, and 10,538,000 bbl. in September 1942, an increase of 89.66 per cent. The increase from August was 3.67 per cent.

Motor fuel delivered from lines in the first 9 months of 1943 totaled 145,080,000 bbl., against 89,674,000 bbl. in the corresponding 1942 period, an increase of 61.79 per cent. In September, the total delivered from lines was 19,310,000 bbl., against 19,172,000 bbl. in August, and 10,004,000 bbl. in August 1942, an increase of 93.02 per cent from a year earlier.

Stocks in lines and working tanks at the end of September totaled 8,406,000 bbl., compared with 7,809,000 bbl. a month earlier, and 6,047,000 bbl. a year earlier.

A.S.M.E. Committees to Study Piping Codes

As a result of recommendations of the subcommittee on scope and intent of the sectional committee on code for pressure piping, B31, two new special subcommittees are being appointed to function under the procedure of Sectional Committee B31, according to an announcement of American Society of Mechanical Engineers.

One of these subcommittees will formulate requirements for instrument piping, the other will develop quality factors for castings and working stresses for steel castings, forgings, plate, and bars, all for inclusion in the American Standard Code for Pressure Piping, ASA B31.1—1942.

It has been recognized for some time that present code requirements and standards for instrument piping are not sufficiently complete to provide adequate assurance of the safety of such piping systems.

Eastward Crude Oil Shipments Increase

Oil shipments into the East are running 500,000 bbl. a day greater than a year ago, largely because of the big-inch pipe line, the Petroleum Administration for War announced last week.

But Administrator Ickes said that despite the "hopeful aspect" petroleum stocks in the East are "still considerably below normal." He described the current position as to heating, industrial and crude oil as "fair," but said gasoline and kerosene supplies were still "tight" because refinery runs in the Southwest and Middle West have not been up to expectations.

Ralph K. Davies, deputy petroleum administrator, said the big-inch line has reached capacity operation, enabling the PAW to end short hauls of petroleum by rail from Norris City, Ill., to the East, which formerly required 11,000 tank cars. These have been put to essential use on other runs.

Phillips Pipe Line Bargaining Agent Is AFL

The National Labor Relations Board announced recently the International Union of Operating Engineers, Local Union 109 (AFL) had been designated exclusive bargaining representative of employes of the Phillips Petroleum Co.'s gasoline pipe-line department from Borger, Tex., to the western bank of the Mississippi River.

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SAFETY PRACTICES in Handling Chemicals

Information supplied by "Oil and Gas Journal"

Chemical handling offers the same hazards in the plant as in the laboratory, complicated by the employment of much larger quantities of chemicals, longer lines and permanent connections which may corrode from within or break or start leaks under conditions less easy to foresee than in the laboratory.

A primary principle to be ingrained in personnel is "Consider every vapor, liquid, spray or other fluid as the most hazardous chemical present, until proved safely otherwise."

Some of the numerous safeguards are: Lines carrying corrosive liquids or vapors crossed by walks, must be covered by rigid conduits, culverts or screens to prevent any pressure. Tanks, blowcases, or other containers for dangerous fluids must not be entered until blown out, steamed out and washed down, to remove completely all liquid and fumes endangering the workmen. Where fumes are prevalent suitable gas masks, protecting against practically any industrial vapor, should be compulsory equipment. Use of such safety equipment should be the "lose-your-job" responsibility of everyone concerned.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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Natural Gas

Lone Star Doubles Output of Its Trinidad Gasoline Plant

DALLAS, Tex.—Capacity of Lone Star Producing Co.'s natural-gasoline plant at Trinidad, Henderson County, Texas, will be doubled under an expansion program which includes equipment to make components of aviation fuel and synthetic rubber. The plant hitherto has made natural gasoline only. The expansion, Fred Townsend, plant superintendent, said, is designed to meet growing demands for natural gasoline in war products.

Isobutane, normal butane, isopentane and heavier hydrocarbons will be processed. The Trinidad plant takes from the Cayuga and Long Lake fields.

The enlargement program calls for installation of a 3 ft. by 60-ft. debutanizer column, a 3½ by 101-ft. butane splitter column and a 3 by 101-ft. deisobutanizer column, a 440-hp. boiler, two absorbers and other equipment.

The new facilities at Trinidad will increase the plant absorption capacity from 80,000,000 cu. ft. of gas daily to 160,000,000 cu. ft.

Tennessee Company Sets Up Field-Price Schedule

Start of construction of the 1,200-mile, 24-in. gas line of Tennessee Gas & Transmission Co. at Nashville, Tenn., December 4, will culminate a period of extended negotiations for this project which the Federal Power Commission has pronounced to be "necessary not only in connection with the war effort but for postwar demands." Gardiner Symonds, president of the company, has recently given information regarding arrangements for the undertaking, which is to be completed September 30, 1944.

Contrary to previous announcements, no government or public money will be used in financing the line. For the construction cost of approximately $50,000,000, Chicago Corp. is putting $12,000,000 into the Tennessee company; it will finance the balance through banks and insurance companies.

The Tennessee company has made a contract with Hope Natural Gas Co. to deliver approximately half of the line's capacity at a price starting at 20.5 cents per 1,000 cu. ft. for the minimum delivery of 75,000,000 cu. ft. per day ranging downward to 18.75 cents per 1,000 cu. ft. for delivery of 100,000,000 cu. ft. per day. This price scale steps up 0.5 cent per 1,000 cu. ft. every 5 years after date of the first delivery. The line will have 100 per cent load factor of 207,000,000 cu. ft. per day with a probable transmission efficiency of 175,000,000 cu. ft. The Tennessee company also has a contract with Manufacturer's Light & Heat Co., subsidiary of Columbia Gas & Electric Co. for taking the remainder of the line's throughput for which it will pay field cost plus a transportation charge which has not yet been computed. Purchase at the well is expected to be more than 4 cents per thousand.

Since common carrier and public utility regulations do not allow a company, such as Tennessee, to earn more than 6.5 per cent on its investment, it will be to Chicago Corp.'s advantage to quote as high a field price for natural gas as possible. Since the line will take ratably, this policy will benefit all operators in the Stratton-Agua Dulce field. Ratable taking will also be required for any field to which the line connects.

The price at which Hope and Columbia will distribute the gas to consumers is unknown but it will probably be in the vicinity of 30 to 40 cents per thousand. At present the market value in the Stratton-Agua Dulce area is from 1 to 1.5 cents per thousand.

Legality of Natural-Gas Tax Upheld by Court of Appeals

AUSTIN, Tex.—Constitutionality of the natural-gas production tax law was upheld by the Galveston Court of Civil Appeals last week in a case in which the W. R. Davis estate attacked its legality.

The appeals court confined its ruling to the issue of taxing recycling operations. The Davis estate contended that the gas-production tax should not be applied on the basis of market value of condensates and distillates made from natural gas.

It was the second case favoring state tax statutes which the Galveston court has affirmed recently. The other was an attack upon the franchise tax law by Houston Oil Co. and others.

Cabot Carbon Co. of Pampa is defendant in an ouster suit filed in Ninety-eighth District Court by the state alleging the company has no permit to operate in Texas. The state's suit is a cross action to one filed by the company attacking the state tax on carbon-black companies.

Sale of Cities Service Colorado Utility Approved

PHILADELPHIA, Pa.—Sale by Cities Service Power & Light Co. of its common stock holdings in Public Service Co. of Colorado was approved by the Securities and Exchange Commission by a vote of 3 to 1. Disposition of the 875,000 shares, valued at $17,500,000, will be arranged through underwriters.

SEC exempted the sale from the requirements of competitive bidding, explaining that there have been relatively few offerings of public-utility common stocks since the competitive bidding rule was introduced and that this is the largest of them.

SEC Approves Purchase of Line by Northern Natural

PHILADELPHIA, Pa.—Sale of the Kansas pipe line transmission system of Argus Natural Gas Co., Inc. to Northern Natural Gas Co. of Omaha, Neb., was approved by the Securities and Exchange Commission here last week. Northern Natural will cancel $700,000 principal amount of Argus' unsecured series A 4½ per cent promissory notes and pay the balance, estimated at $65,743 in cash.

Consolidated Gas Utilities Plans Constructive Work

WASHINGTON, D. C.—The Federal Power Commission will hold a hearing December 10 in Oklahoma City, Okla., on applications filed by Consolidated Gas Utilities Corp., of that city. For authority to construct and operate a compressor station complete with two new 400-hp. gas-engine-driven compressors and auxiliary equipment near Twitty, Tex., and to construct and operate a gas-transmission pipe line approximately 5,600 ft. long and facilities to interconnect existing facilities near Blackwell, Okla.

The company seeks authority also to construct and operate approximately 2,985 ft. of 8⅝-in. gas-transmission pipe line to replace approximately 4,600 ft. of 6⅝-in. line in Grant County, Oklahoma, and to abandon the latter line.

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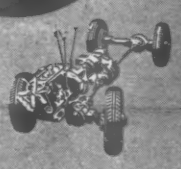

IN EVERY FIELD WHERE TRUCK QUALITY IS PUT TO THE TEST . . . FWD's STAND UP

Exploration and Drilling

Week's Highlights

CONDITIONS which this week prompted Petroleum Administrator Ickes to reemphasize warnings that a critical crude-oil supply situation will shortly develop unless manpower, materials and incentives are sufficient to meet the 1944 projected program of 5,000 exploratory wells already are acute in most areas.

The administrator saw fit to point out that the program is impossible of accomplishment unless additional trained personnel and special equipment are made available. Repeated reference to these factors which are the keystones in the 1944 production operating plan clearly indicates that the War Manpower Commission and the War Production Board's allocation committee are not yet fully in sympathy with the petroleum industry's requirements. Operators in most sections of the country report that supplies of materials are growing slightly more available although it still is necessary to project requirements many months in advance.

"The oil industry today is understaffed. Something must be done," Ickes declared in his most recent statement on exploration and drilling, "to bring men back into oil exploration or we will not have enough oil to meet even essential demands within a short time—too short for comfort."

His statement was subject to at least two conclusions. He virtually invited the oil industry to devise more attractive incentives for return of employes who have drifted into other war work. Also, he left the unmistakable inference that the WMC has a clear obligation to arrange positive deferment for essential oil workers and to exercise whatever pressure is available for channeling men with petroleum-industry experience back into oil jobs if the country is to weather the war drafts on reserves.

The increase of nearly 50 per cent in exploratory wells next year, a rise from the indicated 1943 total of 3,400 to a goal of 5,000, goes much deeper than the drilling phase of operations. Current PAW estimates show that 360 crews are engaged in exploratory work. About 5,900 men are engaged in geophysical work while 4,300 are conducting geological investigations. This preliminary phase of exploration is just as essential as the final determination by the drilling of wells. It is obvious that a 50 per cent increase in the drilling of exploratory wells justifies a compensatory rise in the work preliminary to making locations. Possibly, qualified observers assert, the geological and geophysical phases of exploration may of necessity rise 75 or even 100 per cent in order to offset the growing difficulty of finding drillable prospects.

Administrator Ickes left details of his manpower shortage statement to be filled in by the industry but it is certain that his conclusions covered all personnel assigned to this work from preliminary mapping down to the last connection on a completion.

Another black-oil producing field in the Big Horn basin of Wyoming was proven last week in Fred Goodstein 1 Government, on the T. A. Pedley lease, Little Buffalo Basin structure, Park County. After washing and acidizing the Tensleep sand section from 4,781 ft., the casing seat, to 4,910 ft., the well was estimated capable of 300 to 400 bbl. daily.

The discovery well in a new area west of the Mount Poso field in Kern County, California, proved to be a gas producer with a spray of condensate from the Vedder sand (p. 87).

With one test indicating production in the Madison, efforts are under way to prove a potential northwestern extension of the North Cut Bank field into the Del Bonita-Twin River area of southern Alberta (p. 86).

COMPLETIONS IN ALL FIELDS . . .

(Week ended November 26, 1943)

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1943	1942
N. Y., Penna., W. Va.	47	19	9	75	144,974	3,131	3,155
Ohio	5	8	6	19	50,324	854	1,038
Indiana	1	0	2	3	7,198	200	309
Kentucky	2	2	2	6	14,383	412	172
Illinois	25	0	16	41	114,462	1,605	1,672
Michigan	3	0	10	13	42,302	575	626
Kansas	17	1	15	33	116,980	1,536	1,399
Nebraska	0	0	0	0	0	27	32
Missouri-Iowa	0	0	0	0	0	17	13
Oklahoma	23	3	8	34	127,206	1,084	1,054
Texas:							
North Central Texas	11	0	17	28	91,298	1,353	964
West Texas	19	0	3	22	104,973	836	1,214
Texas Panhandle	4	0	2	6	18,913	186	311
Eastern Texas	5	1	3	9	56,872	279	362
Texas Gulf Coast	8	1	8	17	123,487	434	624
Southwest Texas	10	0	13	23	115,740	838	947
Total Texas	57	2	46	105	511,283	3,906	4,422
North Louisiana	5	2	0	7	26,284	300	441
Louisiana Gulf Coast	2	0	2	4	43,950	331	411
Total Louisiana	7	2	2	11	70,234	631	852
Arkansas	3	0	3	6	28,513	248	164
Mississippi and Southeast	1	0	4	5	19,251	94	55
Montana	2	1	1	4	8,409	214	183
Wyoming	0	0	0	0	0	120	102
Colorado, Utah	0	0	1	1	812	23	23
New Mexico	3	0	3	6	16,955	208	217
California	22	0	4	26	93,890	1,236	702
Total United States	218	38	132	388	1,367,176	16,119	16,190
Total previous week	222	35	131	388			
Week ending Nov. 28, 1942	158	36	102	296			

PERMIAN BASIN

North Pecos County Wildcat Is Shut in for Storage

MIDLAND, Tex. — Bryce McCandless 1-101 Atlantic Refining Co. discovery southeast of Owego, northern Pecos County, was flowing 15 to 36 bbl. of 36-gravity oil into pits after swabbing through tubing set at 4,035 ft., and was shut in to build storage. The test, with elevation of 2,397 ft., was plugged back to 4,079 ft., and casing was perforated at 4,012-37 ft. It lies midway between the Wentz and Apco-Warner pools, producing from the Ellenburger, and will stimulate further exploration along this trend. Phillips Petroleum Co. has already staked a location 2½ miles west of the new strike as its 1 Pascoe, in Section 114, Block 11, H.&G.N. Survey, near two shallow failures.

Upton County. — Final completion gage on Texas Pacific Coal & Oil Co. 52-A Lane, Silurian discovery in the McCamey pool, was 298 bbl. in 24 hours through open 2-in. tubing. The oil tested 43.8 gravity, and was produced through two zones. The first was perforated at 7,125-60 ft., and the lower one at 7,190-7,200 ft.

Andrews County. — The northeast outpost to the Fullerton pool, Bay Petroleum 1 Bitler & Lowe, Section 12, Block A-32, Public School Land, which has been drilling more pay section after assuring a well from the Clear Fork pay, pulled plugged tubing and started to flow out of control, and oil was being pumped into the hole to kill. Humble Oil & Refining Co. 1 Crews & Mast, deep failure plugged back to 4,825 ft. to test. It swabbed 2½ bbl. an hour, 50 per cent water, 30 per cent mud, and the remainder oil. Texas Co. 3 J. E. Mabee, northeast extension to the new pool in southeast Andrews, on a 24-hour test swabbed an average of 4½ bbl. an hour.

Dawson County.—Seaboard Oil Co. 1 Sprayberry, Section 38, Block 34-5n, T.&P. Railway Survey, cored from 6,718-36 ft., recovering 13 ft. of sand and sandy shale with stains and fair saturation.

WEST TEXAS WILDCAT COMPLETIONS

Pecos County: E Russell Lloyd 1 Mrs. E. C. Powell, 1,980 ft. from SE, 660 ft. from SW, Sec. 76, Blk. 10, H.&G.N. Ry. Sur., flow 88 bbl. 35.2 gravity, pay 1,641 ft., T.D. 1,661 ft. Discovery.

Upton County: Texas Pacific Coal & Oil 52-A J. F. Lane, 990 ft. from E, 1,650 ft. from S, Sec. 5, G.C.&S.F. Ry. Sur., O.W.D.D., flow 268 bbl., Silurian lime pay 7,125-7,200 ft., perf. 7,125-60 ft. and 7,190-7,200 ft., O.T.D. 2,151 ft., P.B. 7,230 ft. from T.D. 8,358 ft. Discovery in new pay, McCamey field.

Yoakum County: Hugh W. Stoddard 1 R. M. Kendrick, 660 ft. from S and E, Sec. 748, Blk. D, J. H. Gibson Sur., dry at 7,995 ft.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Skelly Oil Co. 1-U State, NE NE 5-22s-35e, discovery for Lea County, made a 24-hour test of 105 bbl. pumping for final completion. The well, producing from lime pay at 4,025-4,126 ft., is 5 miles west of the South Eunice pool and a like distance southeast of the West Eunice pool. It has been designated as the San Simon pool.

Neville G. Penrose 1 Crozier, wildcat in 1-20s-33e, was abandoned at 3,684 ft. after finding sulfur water. A new San Andres lime exploration for Eddy County is Robert E. McKee et al 1 Spencer-State, NW NW 3-19s-29e, 4 miles south of Loco Hills pool. It is to go to 3,000 ft.

SOUTHEAST NEW MEXICO WILDCAT COMPLETIONS

Lea County: Neville G. Penros 1 A. C. Crozier, SW NW 1-20s-33e, dry at 3,684 ft.

Skelly Oil 1-U State, 660 ft. from N and E Sec. 5-22s-35e, 5 mi. W South Eunice field, pumped 105 bbl., lime pay 4,025-4,125 ft., P.B. to 4,138 ft. from T.D. 3,188 ft. Discovery, San Simon field.

EASTERN TEXAS

Oil Show Directs Attention To Wood County Wildcat

DALLAS, Tex. — Gulf Oil Corp. 1 K. C. Brewer, Lea Survey, 2½ miles southwest of Winnsboro, in northern Wood County, attracted the attention of East Texas operators last week by logging a small show of oil in the Fort Worth lime at 5,745 ft. The test, slated to test the Paluxy, has an elevation of 479 ft. It topped the Georgetown lime at 5,180 ft. and is considered to be running 40 to 60 ft. higher than other deep wells drilled in the area. It is 7 miles south of L. A. Grelling, Jr. 1 Stanley, in the W. B. Jordan Survey, Franklin County, abandoned last July at total depth of 8,442 ft., with the top of the Paluxy logged at 6,088 ft. The well was making hole below 5,950 ft. Danciger Oil & Refining Co. 1 Sparks, southeast of Winnsboro, in the E. Allen Survey, was shut down at 5,210 ft., with top of the Woodbine believed near at that depth. The test has a fishing job.

Camp County.—Gulf Oil 1 Garrett, on the west side of the Pittsburg pool, had oil sand at 7,892 ft., with saturation at 7,903 ft., and was coring ahead.

Franklin County. — The northwest side of the New Hope pool was defined by Humble Oil & Refining Co. 1 Solon King, which had no shows in either the Rodessa or the Travis Peak horizon in drilling to a total depth of 8,243 ft. It was abandoned as dry at that depth.

EAST TEXAS WILDCAT COMPLETIONS

Harrison County: Mae Belcher 1 W. C. Barnes est., 2,229 ft. from N, 2,345 ft. from W, 34-ac. tract, 4,075 ft. from N, 900 ft. from E, M. Lindsey Sur., dry at 3,497 ft.

Hunt County: Humble 1 Josie A. Rutherford, 1,980 ft. from N, 2,300 ft. from E. Samuel Lindsay Sur., 1⅞ mi. W-SW Concord, dry at 7,483 ft.

Leon County: Carter-Gragg Oil 1 W. H. Richmond, 467 ft. from NE and NW farm, or 2,700 ft. from NE, 2,430 ft. from NW, William McMillen Sur., dry at 5,903 ft.

DAILY AVERAGE PRODUCTION FOR WEEK

	Nov. 27 crude oil	Distillate, allied products	Nov. PAW quota all oils	Nov. 20 crude oil
Arkansas	78,400	4,800	81,700	78,350
California	778,500	47,500	842,000	789,250
Colorado	7,450	.....	7,000	7,275
Eastern fields	71,150	8,900	86,800	71,100
Illinois	215,250	12,700	217,600	215,600
Indiana	12,500	.....	14,000	13,175
Kansas	273,200	6,100	291,000	281,350
Kentucky	23,350	3,000	27,500	22,345
Louisiana	351,025	22,000	375,700	350,930
North Louisiana	78,800	.....	.....	78,730
Louisiana Gulf Coast	272,225	.....	.....	272,200
Michigan	54,100	100	56,100	50,100
Mississippi	49,600	.....	49,000	46,735
Montana	21,375	300	23,300	21,600
Nebraska	1,700	.....	1,600	1,750
New Mexico	112,950	6,000	116,600	112,550
Oklahoma	325,800	28,000	346,000	326,650
Texas	1,929,150	126,000	2,004,000	1,924,350
East Texas	376,400	.....	.....	376,450
West Texas	359,750	.....	.....	359,700
North Central Texas	141,900	.....	.....	142,000
East Central Texas	142,950	.....	.....	137,950
Texas Panhandle	85,500	.....	.....	85,500
Texas Gulf Coast	722,100	.....	.....	722,150
Southwest Texas	100,550	.....	.....	100,600
Wyoming	100,850	3,700	100,800	100,950
Total United States	4,406,350	369,100	4,640,700	4,414,060

Total production January 1-November 27, 1943 ..... 1,353,347,400 bbl.
Same period last year ..... 1,291,476,020 bbl.

SOUTHWEST TEXAS

Humble Likely to Open New Field in Brooks County

CORPUS CHRISTI, Tex. — A new field for Brooks County seemed assured as Humble Oil & Refining Co. continued testing its 1 Scott & Hopper wildcat in A.C.H.&B. Survey 107, about 4 miles northeast of the Alta Mesa field. A drill-stem test with total depth 6,522 ft. had flowed at the rate of 15 bbl. of condensate daily and 4,500,000 cu. ft. of gas with gas-oil ratio of 60,000. Oil production previously had been indicated in a test from 6,311-14 ft. where recovery was 500 ft. of pipe-line oil, and 40 ft. of mud with 3½ lb. working pressure in 20 minutes. bottom-hole pressure was 900 lb. flowing and 2,800 lb. shut in.

McMullen County.— Stanolind Oil & Gas Co. was reported planning to deepen the 1 E. M. Henry, a wildcat about 5 miles northwest of Tilden, to a new contract depth of 11,000 ft., which would make it one of the deepest holes ever drilled in the county. This wildcat was temporarily abandoned a few weeks ago at total depth of 6,528 ft.

Bee County.—Siosi Petroleum Co. is entering the play in the Southwest Texas district, staking location for 1 W. A. Handy, a wildcat 660 ft. from the north and east lines of a 925-acre lease in the James O'Reilly Survey A-51.

De Witt County.—Butcher-Arthur, Inc. of Houston, took over Dan Auld's De Witt County drilling deal, and will drill the 1 Frank Kolodziejczyk as an 8,000-ft. Wilcox test on a 162.5-acre tract in the Jose Santos (J. Tinsley) grant, between the Yorktown and Slick-Wilcox fields. The test is supported by Tide Water, Transwestern and Sun and is on a Union Producing Co. farmout with Sun and Pure contributing acreage.

Bee County. — Oil production was indicated in Magnolia's extension test in the Burnell-Wilcox field, the 1 Elizabeth Ingram. It was coring ahead after a 25-minute drill-stem test at 6,811-14 ft. in the Wilcox had recovered about 1,100 ft. of oil and 150 ft. of mud and water with 105-lb. working pressure. It had also shown gas condensate on a test in the Slick sand at 6,654-60 ft. and had shown gas on a drill-stem test in the Luling sand at 6,762-74 ft. This operation is in the James Richardson Survey A-275, 2 miles southwest of the Burnell-Wilcox condensate discovery well.

Karnes County.—Arkansas Fuel Oil is preparing to test 1 E. Lyons, 7 miles northeast of the Hondo Creek field, nearest similar production, and 6 miles southwest of the Nordheim field. The test is to be made in sand at 6,598-6,609 ft., total depth 8,020 ft. A drill-stem test had recovered 424 ft. of 49-gravity oil in 16 minutes with 50 lb. working pressure.

LOWER GULF COAST WILDCAT COMPLETIONS

Bee County: Edwin B. Cox and Jake L. Hamon 1 Mary J. Beedy, 7¾ mi. NE of the discovery oil well at Blanconia field, dry at 5,352 ft.

Karnes County: Indiola Oil Corp. 1 Mrs. Mary Mika, 4 mi. NE of Helena, dry at 6,515 ft.

Willacy County: Baldridge & King and Nichols 1 W. P. Lincoln, 2 mi. SE of Willamar field, dry at 8,514 ft.

SOUTH TEXAS WILDCAT COMPLETIONS

Duval County: Ogden & Voyles 3 M. I. Richardson et al, on SE flank of South Kohler field, dry at 1,844 ft.

Starr County: T. E. Stephens 1 Gonzales heirs, 11 mi. NW of Roma, dry at 5,379 ft.

Brooks County: Southern Minerals Corp. 1 G. O. Frank, 2 mi. SW of Falfurrias, dry at 7,807 ft.

Sun 2-A Charles Boedeker-State, 16 mi. south of Falfurrias, dry at 7,805 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Gonzales County: Amerada and Alder Oil Co. 1 Morgan & Kunetka, 12 mi. S of Gonzales, dry at 6,732 ft.

Travis County: F. M. Gunther 1 W. Z. Berry estate, 5½ mi. NE of Elroy, dry at 1,492 ft.

Wilson County: H. A. Rice 1 Dr. C. E. Scull, 2¾ mi. E of Lavernia, dry at 2,909 ft.

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LOUISIANA GULF

Activity Subsides; No Upturn Expected Till End of Year

NEW ORLEANS, La. — Activity in the Gulf Coast district dropped last week, only three new locations being reported. Four completions were recorded. No marked upturn is expected during the rest of the year.

St. Martin Parish.—Amerada Petroleum Co. 1 Bertinot-Quebedaux Unit, in 44-7s-5e, on the Arnaudville prospect, is preparing to test sands below 10,000 ft.

Acadia Parish.—Union Sulphur Co. has set 5-in. liner in the 1-A Dorris Andrus, 50-8s-2e, in the Branch area, and will test deep sands for gas condensate or oil production. Total depth is 10,536 ft. and liner was set on bottom. This well showed some oil in perforations at 9,927-29 ft., when total depth was 9,936 ft. and 7-in. casing was set at that depth.

Cameron Parish.—Pure Oil Co. 1 State-Snake Lake Lease 549, wildcat on the Snake Lake Prospect, 25-13s-3w, was drilling at 11,050 ft. in hard sand.

Evangeline Parish. — Hassie Hunt, trustee, will drill a 10,000-ft. Wilcox wildcat on the northwest flank of the Pine Prairie dome, north of the present west-flank Wilcox production. It is in 23-3s-1w.

Calcasieu Parish.—E. R. Brann and North American Consolidated Oil are still trying to complete the 2-A Edgewood L. & L. Co., 30-7s-10w, at Perkins, as an oil well. A recent test at 5,372-76 ft. recovered gas condensate with 2,600 lb. working pressure. A test is being run at 5,352-57 ft. and if this fails completion will be tried in the 4 ft. of oil sand at 4,378-82 ft.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Calcasieu Parish: W. T. Burton 1 Erwin estate heirs, 17-11s-8e, South Lake Charles area, dry at 12,043 ft.

Evangeline Parish: Continental and Humble 3 Pardee Lumber Co., discovery well of Reddell area, 20-4s-1w, flowed 156 bbl. condensate in Tate sand 9,961-10,010 ft., perf. 9,960-10,000 ft., show condensate in Haas sand 9,805-32 ft., 2-in. set 9,927 ft., gravity 54 corrected. T.D. 11,589 ft.

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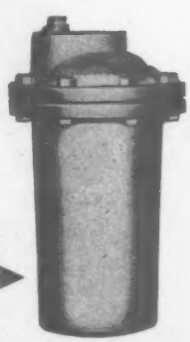

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CANADIAN FIELDS

Extension Well Ready For Testing

CHATHAM, Ont.—Pacific Oil & Refining 1, LSD 12, 18-1-21w4, in the Del Bonita area of southern Alberta north and west of the North Cut Bank field, finished in the Madison limestone at 5,080 ft. with casing set at 5,025 ft., is acidizing and testing, with good initial indications. The lower porous zone below the casing is being acidized, and an upper zone behind the casing will be gun-perforated.

McLeod Oil Co. of Calgary is moving equipment for the McLeod-Del Bonita 1, LSD 13, 14-1-21w4. first test of a block of 10,000 acres.

The Del Bonita and Twin River structures, close to the international boundary, have yielded a number of oil showings chiefly in the top of the Madison, and there is a small production from the Del Bonita area. The Alberta areas are believed to be. structurally, an extension of the Cut Bank field in Montana.

Jumping Pound.—Bottoming at the record depth for Canada of 12,065 ft., Shell-Norman 1, LSD 5, 22-24-5w5, on the Jumping Pound structure in the foothills west of Calgary has started testing of the lower porous zone of the Madison and will later test the upper zone. The 5-in. liner has been set between the 7-in. casing at 9,187 ft. and the dense middle zone of the lime at 11,871 ft.

Pouce Coupe.—An important wildcat test for northern Alberta, Alaska Highway Oil & Gas Co. 3 has spudded. Location is at Braden Crossing on Pouce Coupe River 3 miles south of Alaska Highway 1, and 17 miles east of Dawson Creek. The new test is expected to get oil production in the horizon around 2,565 ft. where No. 1 got a 5,000,000-cu. ft. gas flow.

CALIFORNIA

Dwight Vedder's Mount Poso Wildcat Springs Surprise

LOS ANGELES, Calif. — A surprising development of the week is Dwight Vedder's Mount Poso wildcat in Kern County which, instead of flowing crude oil with a low gas-oil ratio, came in flowing approximately 5,000,000 cu. ft. of gas with only a spray of condensate. Production is from the Vedder sand of Miocene age, with bottom of the hole at 2,470 ft. and top of Vedder at 2,440 ft. This new field is about 1½ miles west of nearest production at Mount Poso and, judging from several dry holes, will probably be limited in extent.

Kern County.—Richfield Oil Corp. has picked up the pay in its second well in the Tejon field at the south end of the San Joaquin Valley and is preparing to complete it. The discovery well, in 35-11n-19w, is pumping 50 bbl. of 18.2-gravity oil daily. At the south end of the Greeley field, Standard is putting the finishing touches on 1 Wegis and is swabbing for production. This well, in 21-29s-26e, will probably result in additional drilling to the south although Standard holds leases on most of the potentially productive acreage.

Los Angeles County.—Federal Oil Co. completed an excellent flowing well at the northwest end of the Inglewood field in the Sentous zone of Miocene age and the success at this point tends to indicate the existence of major production over the line into Culver City. Federal's new well, which showed a potential of better than 4,000 bbl. daily, might lead to additional drilling in Culver City although it would be necessary to move private residences.

Ford zone development has started in the Wilmington field, but large production will not be obtained until operators move into the Long Beach harbor section, where the zone is still in a virgin state. Texas Co.'s deep test in the Long Beach field is still held up with a fishing job at 9,694 ft. Standard's test in the Whittier field failed to find anything down to 8,033 ft. and is being plugged back to the upper zone.

San Luis Obispo County.—Los Nietos Oil Co. has logged 53 ft. of solid oil sand from 3,102-155 ft. in 1 Scott in the Arroyo Grande district. Casing has been landed at 3,095 ft. preparatory to an early test. Production developed in this area in the past has been very heavy viscous oil and for this reason the outcome of the projected production test will be watched with interest.

CALIFORNIA WILDCAT COMPLETIONS

Agoura wildcat district, Los Angeles County: British American 1 Coleman, 25-1n-18w, dry at 1,725 ft.

Hamilton City wildcat district, Glenn County: Superior 72-20 Glenn Comm. 3, 31-21n-1w, dry at 9,179 ft., no showings.

Terra Bella wildcat district, Tulare County: Richfield 1-1 Terra Bella Comm., 19-22s-27e, dry at 2,353 ft., no showings.

ROCKY MOUNTAIN

Southwestern Colorado Gains Two Wildcat Tests

DENVER, Colo. — Two wildcats spotted in southwestern Colorado calls attention to an area which has not been in the limelight during the present exploration campaign in the Rocky Mountain states. One of these will be drilled by the Stanolind Oil & Gas Co. on the McElmo Canyon structure in Montezuma County, 15 miles east of the Utah line at its 1 Government, C SW NW 24-36n-18w. The other is Ashback & Locke 1 Krueger, CEL SW NE 34-33n-12w, in the Red Mesa district, La Plata County.

The Stanolind test is approximately half mile southeast of a well drilled 21 years ago by its predecessor, the Midwest Oil Co. It started in the Triassic and had its first show of oil in green sand and shale at 1,740 ft. Above this horizon, at 1,520 ft., it had a show of 50,000 cu. ft. of gas. At 1,888 ft., in red sand and shale, it had a show of oil which bailed 6 bbl., 50 per cent gasoline and 67-gravity oil, and 22 bbl. of salt water. It had 4,000,000 cu. ft. of gas in black lime at 4,217 ft., and from 4,200 to 4,588 ft. the lime gave strong shows of light oil, but when shot with 140 qt., it flowed only salt water.

The Red Mesa test is on land formerly held by the McGarr Petroleum Co., and near a well drilled by that company in 1936, to 3,680 ft., but which was suspended without being completed. A mile to the north, the McGarr Co. drilled a well in 1928 which was a small producer and supplied a skimming plant on the lease for a number of years.

Approximately 15 crews of geologists and seismograph men have been at work within that general area within the past year or two, the territory surveyed extending from northwest New Mexico over into southern Colorado. Among these were the Stanolind company, the Atlantic Refining Co. and the Amerada Petroleum Corp. On the New Mexico side are the shallow high-gravity Hogback, Table Mesa and Rattlesnake oil fields.

Well runs into fire. — Something new in the way of a discovery took place in the Southern Union Production Co. 5 Ute Lease, SE SW NW 15-32n-14w, on the Barker Creek structure, Northwest New Mexico. It ran into a burning coal bed at 730 ft. The heat was too great for the tools and water evaporated as fast as it was put into the hole.

Elk Basin lease litigation.—Another legal contest between the State of Wyoming and the federal Government over title to a valuable tract of land in the Elk Basin field is in the offing as a result of the Wyoming State Land Board leasing 480 acres in 36-58n-100w, to the Ohio Oil Co. The Ohio company has operated a state lease in the northeast of the section, on which it has three shallow wells, for a number of years. The state claims title to the entire section on the basis of the Coleman Survey in 1894 and the federal land grant effected when the state was admitted to the Union. The land was withdrawn by the federal Government in 1913, claiming it was mineral bearing. Prior to the discovery of oil in the Tensleep last December by the Minnelusa Oil Corp., the tract was outside the known producing boundaries of the field.

COLORADO WILDCAT COMPLETION

Little Poose Creek, Rio Blanco County: Rio Oil Co., Inc. 1 Government NW NW NE 28-3n-88w, T.D. 812 ft., pulling 12½-in. to abandon. Will move to new location on Sec. 21. Show of gas in top of Sundance at 397 ft., followed by water.

MONTANA WILDCAT COMPLETIONS

East Kevin, Toole County: Northern Ordnance, Inc. 1 Kevin-State, CSL NE NE 36-35n-1e, T. D. 1,991 ft., 7-in. 1,965 ft., Ellis-Madison 1,972 ft., tested 4,500,000 cu. ft. gas with some water, cemented off water and gas and standing.

Red Creek, Toole County: Northern Ordnance, Inc. 1-C State, C SW SW 5-37n-4w., T.D. 2,695 ft., plugged back to 2,645 ft., tested ½ bbl. oil in 24 hours from Madison, temp. abandoned.

MICHIGAN

Week's 13 Completions Net Three Small Oil Wells

SAGINAW, Mich. — Drillers completed 13 tests in the past week, getting three small oil wells—a 150-bbl. producer in Van Buren County, a 25-bbl. well in Bay County, and a 4-bbl. completion in Allegan County. Of the 10 dry holes, 8 were wildcat tests. The state Conservation Department issued 14 drilling permits, Osceola County getting four, Van Buren three, and Allegan, Huron, Mason, St. Clair, Barry, Tuscola, Ottawa and Missaukee one each.

While the search for new oil pools continued unsuccessfully, controversy continued over proposals for further curtailment in production from existing fields. The state Oil Advisory Board, confronted with conflicting testimony, postponed action to allow more exhaustive study of a plan to reduce withdrawal limits from wells in the Reed City pool, currently producing more than a third of Michi-

gan's crude. Because of appeals for oil from Michigan refineries and unsuccessful wildcatting, the demand has grown for less severe restrictions.

MICHIGAN WILDCAT COMPLETIONS

Arenac County, Adams Township: Ervin Major 1 Dexter Horton, 28-19n-3e, dry at 4,610 ft.

Barry County, Irving Township: Three-A Drilling Co. 1 W. N. Burns, 6-4n-9w, dry at 2,045 ft.

Clare County, Arthur Township: Turner Petroleum Co. 1 Hildenbrandt, communitized, 34-18n-3w, dry at 1,556 ft.

Gratiot County, Sumner Township: Prudential Oil & Gas Corp. 1 J. Schnapp-W. Wight, 19-11n-4w, dry at 1,045 ft.

Missaukee County, West Branch Township: Freeman Oil Co. 1 Allen estate, 19-23n-6w, dry at 3,812 ft.

Osceola County, Cedar Township: Sun 3 William H. Richardson, 15-18n-9w, dry at 4,086 ft.

Roscommon County, Higgins Township: Rowmor & Leonard 1 Rowmor fee, 16-24n-2w, dry at 4,507 ft.

Roscommon Township: American Drilling Co. A-1 State-Roscommon, 9-21n-3w, dry at 4,375 ft.

APPALACHIAN FIELDS

Tools Lost at 8,028 ft. in Westmoreland Test

PITTSBURGH, Pa.—The deep wildcat of the Manufacturers Light & Heat Co. on the J. C. Hockenberry farm in Mercer Township, Butler County, was bottomed in the Queenston red shale at 6,680 ft., with the bottom of the Clinton sand placed at 6,555 ft. There was no commercial showing of gas in the lower Devonian nor in the Silurian but also there was no showing of water in the Newburg or Clinton.

Westmoreland County.—The Peoples Natural Gas Co. lost the tools due to a gas pocket at 8,028 ft. in the wildcat on the Camilla Giffin farm on Chestnut Ridge in Derry Township, Westmoreland County and operators are fishing 180 ft. off bottom. The formation has not been identified after passing through a Marcellus interval below the Tully lime and again another lime section and back into shale. The Onondaga lime is past due and a second major fault may have occurred.

WEST VIRGINIA

Tucker County.—On the Blackwater anticline in Dry Fork district, the deep wildcat of the Ohio Oil Co. reached 7,979 ft. and lost the tools and about 100 ft. of line. The formation is sandy shale from which there was an additional 25,000 cu. ft. of gas.

Raleigh County.—In the Richmond district Godfrey L. Cabot, Inc. topped the Big lime at 1,148 ft. in 1,115 C. E. Gwinn and drilled to 2,040 ft. In Marsh Fork district, Columbia Carbon Co. topped the Maxton sand at 1,960 ft. in 720 Rowland Land Co., and have the tools stuck at 1,966 ft.

TEXAS GULF COAST

Second Producer Completed In Little Kentucky Field

HOUSTON, Tex.—The second producer completed in the Little Kentucky field of Jackson County is W. L. Pickens 1 Ben Huseman, flowing on potential test 142.24 bbl. of 35.7 gravity oil daily through 7/64-in. choke with tubing pressure of 890 lb., casing pressure 840 lb. and gas-oil ratio 348:1. This well, in Morris-Cummings Survey 34, is 990 ft. east northeast of the 1 Kramer discovery well drilled by the same operator. Completion was made in perforations at 5,704-08 ft., 2-in. tubing at 5,670 ft., and total depth 5,850 ft. The 5½-in. casing was set at 5,848 ft.

Liberty County.—William Helis has staked location for a second test in the recently opened Cottonwood field in Liberty County, and it is an east-southeast offset to the 1 Hirch estate, the discovery well.

San Jacinto County.—Shell Oil Co., is drilling ahead at 9,050 ft. in the 11 Central Coal & Coke Co., James Robinson Survey A-45, on the west side of the Mercy field. The operator obtained a permit to deepen this well to 11,000 ft. to explore deep sands in the Wilcox. Shell recently abandoned a similar deep Wilcox test on the north flank of the field.

Montgomery County.—Superior Oil Co. of California 2-C T. A. McWhorter et al, in T. J. Nichols Survey A-397, Lake Creek field, is completed as another triple-sand producer. With total depth 10,302 ft., 7-in. casing was set at 10,280 ft. and 5-in. at 9,951 ft. Completion was made as follows: "B" sand, perforated at 9,790-9,810 ft. and flowing between 5-in. and 7⅝-in. casings, made 258 bbl. daily through ¼-in. choke, gravity 56, working pressure 1,450 lb.; "C" sand, perforated at 9,988-10,000 ft. and flowing between the 5-in. casing and the 2½-in. tubing, made 306 bbl. daily through ¼-in. choke, gravity 54.2, working pressure 2,700 lb.; "D" sand, no perforations, 10,282-10,302 ft. and flowing through 2½-in. tubing, made 420 bbl. daily through ¼-in. choke, gravity 52.5, working pressure 2,700 lb.

Austin County.—Pan American Producing Co. is preparing for a new test at 1 Austin College, William C. Harvey Survey, on the southwest flank of the Raccoon Bend field, after showing only fresh and brackish water on drill-stem tests in perforations at 7,634-46 ft.

TEXAS UPPER GULF COAST WILDCAT COMPLETIONS

Chambers County: Standard Oil Co. of Texas 1-105 State-Galveston Bay, 1½ mi. offshort at Smith Point, dry at 8,875 ft.

Colorado County: Charles E. Fraser, Inc. 1 A. L. Tracy, 5 mi. NW of Garwood, dry at 6,860 ft.

Fort Bend County: Windsor Oil Co. 1 Bassett Blakely, NE flank Blue Ridge dome, dry at 5,266 ft.

Harris County: Ludeau Oil Co. 1 J. E. Ledeau, 9 mi. north of Houston, dry at 4,464 ft.

Matagorda County: Sun 1 Strnadel, 4 mi. SW of Midfield, dry at 10,849 ft.

Texas Co. 2 C. G. Hamill, 9 mi. south of Sargent, dry at 6,745 ft.

Polk County: Humble 3-B W. F. Carter & Bro., deep Wilcox test on northwest flank of Segno dome, dry at 10,176 ft.

Wharton County: Pan American 1 J. Brooks Gary, SW flank Boling dome, dry at 6,065 ft.

N. CENTRAL TEXAS

Week Produces Three Good Wells in Hildreth Pool

WICHITA FALLS, Tex.—The Hildreth pool of Montague County got three good wells during the past week. Largest was Sinclair Prairie Oil Co. 2 Middleton, in the north part of the pool. It was completed for a daily potential of 2,430 bbl. based on flow of 303.78 bbl. on a 3-hour test, from a total depth of 6,110 ft. Two of the new wells were completed by Continental Oil Co. Its 1-A Gadberry flowed 326.4 bbl. in 6 hours to rate a daily potential of 1,345 bbl., and its 1 Steed, on the south side of the pool, flowed 348.6 bbl. in 6 hours to rate a daily potential of 1,393 bbl. All are producing from the Bend conglomerate formation. The Simpson sand also produces in the pool. Southwest of the Owens-Hults pool in western Montague County, Gulf Oil Corp. 1 Haggard was drilling below 6,330 ft. after failing to produce in the expected zone. Continental Oil 1 Spencer, new discovery prospect in the E. Green Survey, swabbed 18 bbl. of oil and 1 bbl. of water in 8 hours, after a 10-qt. shot at a total depth of 2,778 ft. A new wildcat to go to 6,500 ft. is S. D. Johnson and Alco Valve Co. 1 S. D. Howard, in the College Survey, 5 miles south of Belcherville.

Clay County.—Shell Oil, Inc. 1 Wynn reacidized the Ellenburger formation at 6,691-6,795 ft. and swabbed 24 bbl. of salty water. It was plugged back to 6,475 ft. where it will test the Mississippian.

Jack County.—Shell's pool opener, 1 Pursley, Slaughter Survey, acidized the Mississippian pay from 5,443-5,640 ft. and shot with 100 qt. of nitroglycerin after swabbing 40 bbl. of oil and 10 bbl. of fresh water in 18 hours. Two new deep locations were announced for the county. L. T. Burns 1 J. H. Bowen is 3 miles southeast of the Antelope pool. It will go to 6,250 ft. Jack Pot Oil Co. 1 Bloodworth is in the J. B. Irwin Survey, in a shallow producing area, and will go to 6,000 ft.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County: S. F. Hutcheson 1 Karl

Lindeman, 1,800 ft. from S and W, Sec. 61, Blk. 4, Clark & Plumb subd., dry at 1,067 ft.

G. E. Kadane & Sons 1-B Cullum & Jones, 2,310 ft. from N, 330 ft. from E, S.P. Ry. Sur., 2 mi. E. Mankins, dry at 4,503 ft.

Cooke County: Bridwell Oil 1-A W. H. and Louise Campbell, 660 ft. from E, 2,776 ft. from S, O. F. Leverett Sur., 4 mi. NE Muenster, dry at 1,525 ft.

Phillips Petroleum, Perkins & Bourland 1 J. Dangelmeyer, 600 ft. from S and W, N 260 ac., E 1,001 ac. E. Langford Sur., 7 mi. SW Muenster, flow 828 bbl., 37.4 grav., Ellenburger pay 2,176-83 ft., T.D. 2,183 ft. Discovery.

Jack County: Billy Bridewell 1 S. E. McClure, 330 ft. from N and W, 80-ac. lease, T. L. Wales Sur., 7 mi. S Bryson, dry at 2,210 ft.

Young County: Anderson-Prichard 1 H. C. Myers-A. A. Walsh, 1,800 ft. from S, 995 ft. from W, 161.4-ac. lease, T.E.&L. Sur., flow 2,224 bbl., 42.50 grav., perf. 4,254-59 ft., Mississippi lime 4,514 ft., Ellenburger 4,657 ft., T.D. 4,858 ft. Discovery.

WEST CENTRAL TEXAS

ABILENE, Tex.—A new pool from the Gray sand of the Strawn section in Coleman County has been opened by Hunter & Hunter 1 Williams, SE SW Section 18, Block 2, G.H.&H. Ry. Survey, south of Novice. The discovery is estimated good for 100 bbl. a day from pay at 3,745-55 ft. This makes the fifth pool for the immediate area, Novice, North Novice, Silver Valley, and Coker having been discovered in that order.

Preparations to complete from the Canyon sand were being made at Great Lakes Carbon Co. 1 Hardy, 7 miles north of Anson in Jones County. The well started flowing through perforations at 3,690-3,710 ft. when tubing was run. The flow was estimated at 8½ bbl. an hour.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Brown County: George McClung 1 Wade Chambers, 700 ft. from E, 235 ft. from S, 125-ac. tract, B.B.B.&C. Ry. Sur., dry at 425 ft.

Haskell County: Humble 1 H. Wiltbanks, Georgetown Ry. Sur., dry at 5,992 ft.

Jones County: Alston & Pace 1 Penrod et al, Sec. 28, Blk. 18, T.&P. Ry. Sur., dry at 3,103 ft.

Great Lakes Carbon 1 C. N. Humphrey, Sec. 2, Blk. 4, H.&T.C. Ry. Sur., dry at 5,250 ft.

Shackelford County: Harry Hines 1 Dawson & Conway, Sec. 194, E.T. Ry. Sur., dry at 1,925 ft.

Tennessee Compiles New Oil and Gas Map

NASHVILLE, Tenn.—A new oil and gas map of Middle Tennessee, including a columnar section showing the stratigraphic position of producting horizons, field locations and a condensed history of the productive areas has been compiled by Kendall E. Born of the Department of Conservation, Division of Geology, headquartering here.

Walter F. Pound, state geologist, said that the new map is a complete revision of a former map which was available only in blue-print form. Generalized structural contours are based on top of the Chattanooga shale. Included in the map is the Highland rim, the Central basin and the Cumberland plateau.

The table of oil and gas data is keyed to the map. The table gives the name of the field, county location, date of discovery, 1943 status, number of wells drilled, completed oil wells, accumulative production to 1943, characteristics of the production, pressures, age and character of the producing horizon, type of structure and the deepest horizon tested to 1943.

Scale of map is 1 in. equals 16 miles. The map sells for 25 cents.

ILLINOIS

Wildcats Find Production In Four Counties

CENTRALIA, Ill.—Forty-one completions, including 25 oil wells, 6 of which were discovery wells, were recorded in Illinois in the past week. The new oil wells averaged 170 bbl. initially, ranging from 8 bbl. up to 916 bbl. in 24 hours. Sixteen dry holes were reported.

The new work included 51 starts, of which 7 were wildcats as follows: Dickerson & Liebnecht 1, SE SE SE 3-2s-3e, Jefferson County; Jarvis Bros. and Marcell 1 G. Tallman, NW NE NE 26-3s-10e, White County; Herndon Drilling Co. 1 Fecht, SE SE SW 33-26n-9e, Ford County; I. M. Conrey 1 Foreman, SE SW SW 18-4n-3w, Bond County; E. S. Cumbrie 1-A Rybecki, NE NE SE 7-3s-1w, Washington County; H. W. Kirkpatrick 1 E. Morris, NE SE NE 27-11n-7e, Cumberland County; C. H. Davis 1 J. W. Taft, C N½ SE NE 15-15n-3w, Sangamon County.

The discovery wells, which are listed in detail in the wildcat completions below, were three in Edwards and one each in Fayette, Wayne and White counties. Only one of these started off with a sizable production, that being Superior Oil Co. 1 Lydia Lipper, NW NE SW 28-1s-14w, Edwards County, which pumped 209 bbl. of oil and 34 bbl. of water from Cypress sand. The Wayne County discovery started at 140 bbl. and the White County discovery at 65 bbl. The others were small wells.

The largest initial producer of the week was Mohawk Drilling Co. 1 Pepple, a "near" wildcat in the E½ NE NW 24-2s-4e, which extended the North Markham City pool in Jefferson County. The well produced 916 bbl. of oil from McClosky lime at 3,086-92 ft. and 3,097-3,103 ft., total depth 3,109 ft.

Another notably good completion was Deep Rock Oil & Gas Co. 2 Clyde Young, C NE NE 32-1s-7e, which pumped 317 bbl. the first day and 468 bbl. the following day from McClosky lime at 3,266-70 ft., which had been acidized.

C. R. Collins and Floyd Collins 1 Fannie Weir, NW SW SE 27-1s-8e, Wayne County, not yet on the completion list, flowed 502 bbl. naturally in 24 hours from McClosky lime at 3,153-58 ft., giving the South Mount Erie pool a new pay.

ILLINOIS WILDCAT COMPLETIONS

Clark County: Cornelius & Collins 1 Sackrider, SE SE SW 13-9n-12w, dry at 1,500 ft.

Cumberland County: Defter & Gilcrist 1 L. L. Huisinger, NE NE SE 30-9n-9e, dry at 2,727 ft.

Edwards County: Phillips Petroleum 1 Sam Fields, SE NE SE 6-3s-10e, dry at 3,434 ft. Menard 2,421 ft., Cypress 2,927 ft., Benoist 3,074 ft., McClosky 3,255-66 and 3,294-3,307 ft.

Superior 1 Agnes Jack, SE SW SE 5-2s-14w, pumped 16 bbl. oil, 34 bbl. water. Benoist sand 2,863-67 ft., shot; Aux Vases sand 2,978-90 ft., T.D. 3,142 ft. New pool in Benoist sand.

Superior 1 Lydia Lipper, NW NE SW 28-1s-14w, pumped 209 bbl. oil, 34 bbl. water. Cypress sand 2,692-2,738 ft., shot; Weiler sand 2,653-70 ft., T.D. 3,090 ft. New pool.

Lewis Production 1-A I. Dunk, NE SE SE 36-2s-10e, pumped 15 bbl. Waltersburg sand 2,377-90 ft. and 2,395-2,401 ft., T.D. 2,455 ft. New pool.

Fayette County: J. J. Callahan et al H. E. Ledbetter, C NE SW 22-5n-4e, pumped 26 bbl. oil, 63 bbl. water. Benoist sand 2,338-48 ft., shot; T.D. 2,359 ft.

Jasper County: Big Chief 1 Oran Keach, C N½ NE SE 27-8n-9e, dry at 2,799 ft. Glen Dean 2,244 ft., Cypress 2,444 ft., Aux Vases 2,632 ft., St. Louis lime 2,793 ft.

Marion County: British American 1 B. T. Dannells, NW SE SW 2-3n-4e, dry at 2,999 ft. Menard 2,206 ft., Cypress 2,595 ft., Aux Vases 2,856 ft., Ste. Genevieve 2,902 ft., no McClosky lime.

Washington County: Werner Bros. 1 Mueller, NW NW NE 3-2s-3w, dry at 1,578 ft. Upper Glen Dean 930 ft., Cypress 1,143 ft., Benoist 1,282 ft., Aux Vases 1,360 ft., McClosky 1,516-19 ft.

Wayne County: W. G. Fortner 1 Woods, SE NE NW 13-2s-9e, dry at 3,411 ft. Menard 2,472 ft., Cypress 2,980 ft., Benoist 3,127 ft., McClosky 3,309 ft. and 3,360-64 ft.

Texas 1 E. Hoffer, NE NE NE 9-1n-6e, pumped 140 bbl. Lower O'Hara (Levias) 3,192-97 ft. and McClosky 3,257, 3,254-57 and 3,298-3,302 ft., T.D. 3,322 ft. New pool.

White County: C. E. Skiles and Partee 1 H. Hoerner, E½ NW NE 25-3s-10e, pumped 65 bbl. Benoist sand 2,924-34 ft., T.D. 3,176 ft. New pool.

OKLAHOMA

New Pools Opened in Old Settled Areas

TWO wildcat completions last week opened new producing areas in Payne and Seminole counties. In the southeastern corner of Payne County, J. E. Crosbie 1 Myatt was completed at 418 bbl. of 45-gravity oil, with 5,000,000 cu. ft. of gas, in Misener sand at 3,750-56 ft. The first flow, through perforations in the sand, was 225 bbl. in 1½ hours. Later it flowed

300 bbl. in 24 hours through 13/64-in. choke.

In Seminole County, about 2 miles northwest of the Wewoka Townsite pool, Fred Haddock 1 Davis & Patterson flowed 150 bbl. in 24 hours through perforations at 3,335-44 ft. in Booch sand. A good sand body 23 ft. thick was found.

Pottawatomie County.—Stanolind Oil & Gas Co. 1 Rosebush, SW SW SW 19-8n-2e, between the Brooksville and McComb Hunton lime pools, cored soft Simpson dolomite at 6,087-96 ft. and was drilling ahead for the Wilcox. Other tops found were the Viola at 5,909 ft., Dense 5,965 ft., and dolomite at 6,044 ft. The last 4 ft. of the core had a good stain and strong odor of oil.

OKLAHOMA WILDCAT COMPLETIONS

Comanche County: English Drlg. 1 Worthen, NW NW NW 4-1n-12w, dry, T.D. 1,675 ft.

Garvin County: H. N. Conley 1 Hayes, SE SE NE 22-4n-1w, dry, T.D. 1,092 ft., gas sand 885-903 ft., gaged 558,000 cu. ft., S.I.P. 210 lb.

Grady County: Jordan Pet. 1 Pursley, SE SW SW 17-4n-6w, dry, T.D. 6,922 ft., sands 4,343 ft., 4,434 ft. and 4,498 ft.

Jefferson County: Bridwell Oil 1 Grogan, SW SE SE 35-7s-6w, dry, T.D. 2,502 ft.

Payne County: J. E. Crosbie 1 Myatt, NE SW 25-19n-4e, flowed 418 bbl. 2½ hr., 5,000,000 cu. ft. gas, Misener sand 3,750-56 ft., gravity 45.

Seminole County: Fred Haddock 1 Davis & Patterson, SW SW NE 2-8n-7e, flowed 150 bbl., Booch sand 3,325-47 ft.

MISSISSIPPI

California Gets Producer in Wilcox, Cranfield Area

JACKSON, Miss.—California Co. was completing 1 Ella G. Lees from the 4,300-ft. Wilcox sand in the Cranfield field, Adams County. Another test in the area, California Co. 2 National Gasoline Co. of Louisiana, Inc., failed to indicate a commercial well and was shut down for orders at 7,037 ft. The producer was flowing oil, with no gage yet available, from perforations at 4,371-79 ft.

Gulf Refining Co. continued to drill deeper in the 1 G. S. Stanley, 34-10n-9w, in the Eucutta area of Wayne County, going ahead around 7,300 ft. in red shale. This test picked up a show of heavy black oil in the Davis sand.

Vaughey & Vaughey completed 1 Louise Dixon, 32-12n-3e, Pickens field, Yazoo County, flowing 100 bbl. of oil in 12 hours through ¼-in. choke from the Wilburn sand at 4,821-24 ft. Completion was made in open hole, with total depth 4,824 ft.

Humble Oil & Refining Co.'s deep test in Greene County, the 1 I. A. Hurst, 33-5s-8w, drilled below 11,750 ft. California Co.'s deep test in Lincoln County, 4-7n-7e, Brookhaven area, was abandoned at 12,843 ft. after running electric log to bottom.

MISSISSIPPI WILDCAT COMPLETIONS

Jones County: Gulf 1-A S. C. Lowry, 31-7n-13w, dry at 2,294 ft.

Lincoln County: California Co. 1 Hattie Smith et al unit, 4-7n-7e, Brookhaven area, dry at 12,843 ft.

OHIO, KENTUCKY

Three Gas Areas Are Extended During Week

ZANESVILLE, Ohio.—The Sandyville gas field was extended ½ mile to the south into Goshen Township, Tuscarawas County, by J. A. Upham's Dessaker well in Section 2. The well gaged 944,000 cu. ft. of gas with a rock pressure of 1,310 lb. from the Clinton at 5,063-80 ft. Upham is now drilling another well 3 miles farther to the south.

The Old Columbia Station pool in Lorain County was extended ½ mile to the south by the Bracy well in Lot 83, completed by the Ohio Fuel Co. The Clinton was found at 2,618-28 ft. and gaged 1,780,000 cu. ft. of gas.

The Granger pool in Medina County was extended ½ mile to the north by the Ohio Fuel's Reasoner completion in Lot 99. The well gaged 874,000 cu. ft. of gas with 1,210 lb. pressure from the Clinton at 3,346-3,419 ft.

A small oil well was completed by Wittmer in the West Zanesville area and another by the Preston Oil in the Clayton pool.

WESTERN KENTUCKY

OWENSBORO, Ky.—Wood, Lacy et al opened a pool in Henderson County, 4 miles from other production with their 2 Bauldauf, about 4 miles northwest of Geneva. It swabbed at the rate of 400 bbl. per day from Tar Springs sand at 1,862-71 ft. It was not yet a completion. Wood & Lacy's 1 Bauldauf is a small well good for about 10 bbl. a day from Tar Springs pay.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Henderson County: C. Wood and W. F. Lacy 1 Bauldauf, 4 mi. NW of Geneva, 10 bbl. oil, 120 bbl. water. Tar Springs sand 1,873-87 ft., T.D. 2,315 ft.

Daviess County: Ohio Oil and Basin Drilling 1 St. Raphael's church lot, dry at 2,126 ft. Kinkaid 1,103 ft., Glen Dean 1,510 ft., Paint Creek 1,895 ft., Ste. Genevieve 1,926 ft. No shows at any depth.

INDIANA

EVANSVILLE, Ind.—The prospect of a new pool in Posey County, Indiana, is held out by Bennett Bros. 1 J. W. Spencer, NE SW SW 32-6s-14w, which found saturation in Tar Springs sand at 2,142-49 ft. On a 1-hour drillstem test 1,453 ft. of clean oil was developed, along with a good gas showing. The well is 3½ miles northwest of the Mount Vernon pool.

All the completions of the week were of the routine order in proven fields.

KANSAS

Barber County Wildcat Is Prospective Viola Pool

DEEP ROCK OIL CORP. 2 Skinner, SW NW SE 29-31-14w, 6 miles southeast of Sun City and northeast of the Deerhead pool, was expected to make a producer in Viola lime, topped at 3,626 ft. Total depth was 3,646 ft. and operators were acidizing before making a production test.

Saline County.—Margay Oil Corp.'s Viola lime discovery, which recently filled the hole with oil at 3,364-79 ft., was ready to be drilled in the early part of this week.

Marion County.—Mississippian chat production was extended about 3½ miles northeast of the Roxbury, Henne and Crowther chat pools of McPherson County at Nelson Drilling Co. 1 Fenske, CWL NW SW 6-17-1e. The well pumped 50 bbl. of oil in 6 hours and then at the rate of 17 bbl. an hour at total depth of 2,683 ft. Location is in the extreme northwestern corner of the county.

KANSAS WILDCAT COMPLETIONS

Barton County: Helmerich & Payne 1 Piller, NE NE NE 32-19-15w, dry, T.D. 3,690 ft., Arbuckle 3,633 ft.

Ellis County: Darby Pet. 1 Penney, W½ SW SE 29-14-18w, dry, T.D. 3,714 ft., Arbuckle 3,675 ft.

Logan County: Texas Co. 1 Smith, NE NE SW 30-11-36w, dry, T.D. 5,360 ft., Topeka 3,904 ft., Kansas City 4,262 ft., Mississippian lime 4,850 ft.

McPherson County: Brown & Strause 1 Leffler, SE SE NE 23-19-1w, dry, T.D. 2,943 ft., Mississippian chat 2,906 ft.

Nelson Drilling 1 Messinger, NW NW 5-18-1w, dry, T.D. 2,939 ft., Mississippian chat 2,709 ft., Kansas City 2,145 ft.

Thomas County: Texas Co. 1 Dougherty, NW SW SW 23-6-33w, dry, T.D. 5,023 ft., Kansas City 4,340 ft., Mississippian lime 4,540 ft., Arbuckle 4,918 ft.

NEBRASKA

ST. JOSEPH, Mo.—Hopes for production from the Viola limestone rose the past week when a showing was found in that zone in the Skelly Oil Co.'s 1 Henry Roesch well in the Barada pool of Richardson County, in N½ NW 36-3n-16e. This was the discovery well of the pool and produced until fairly recently from the Hunton lime. The Hunton top was at 2,432 ft. and the Viola was found at 3,016 ft. On the strength of the showing of oil a liner was to be run for a test. Monebia Development Co. deepened the Skelly well. Thus far there is only one Viola well in Nebraska, the 1 Wiltse, a small producer owned by Skelly in the Ogle pool, near Dawson in Richardson County.

Wildcat Completions and Discoveries

THIRTEEN wildcats were completed as oil wells last week, 6 of which were in Illinois, out of a total of 82 finished. Oklahoma, North and West Texas and New Mexico accounted for the balance of discoveries.

A new Ellenburger pool was opened about 7 miles southwest of the Muenster pool in Cooke County, North Texas. The well, Phillips Petroleum et al 1 Dangelmeyer, flowed 85 bbl. of oil in 2½ hours through tubing choke and made initial potential of 828 bbl. a day. Location is about equal distance from the Muenster and Voth pools and opens the intervening area.

In Southwestern Young County, North Texas, a 2-mile extension to the Murray pool was completed. Anderson-Prichard 1 Myers & Walsh found the Marble Falls lime productive after plugging back from the Ellenburger zone at 4,657 ft. Total depth was 4,858 ft., with oil shows in other horizons reported.

The San Simon field was opened in Lea County, Southeast New Mexico, at Skelly Oil Co. 1-U State, 5 miles west of the South Unice field. The producing zone is in limestone at 4,025-4,125 ft., the approximate level of Unice, indicating possible production between the two pools.

WILDCAT COMPLETIONS

	Week ended November 27, 1943					Cumulative total for 1943				
	Oil	Distillate	Gas	Dry	Total	Oil	Distillate	Gas	Dry	Total
Ohio	0	0	0	0	0	4	0	23	52	79
Indiana	0	0	0	0	0	4	0	0	52	56
Kentucky	0	0	0	0	0	20	0	2	108	131
Illinois	6	0	0	7	13	74	0	3	369	446
Michigan	0	0	0	8	8	11	0	2	157	170
Kansas	0	0	0	6	6	55	0	1	338	394
Nebraska-Missouri-Iowa	0	0	0	0	0	0	0	0	24	24
Oklahoma	2	0	0	4	6	42	1	17	241	301
Texas:										
North Central	2	0	0	9	11	53	0	1	330	384
West	2	0	0	1	3	14	0	1	76	91
Panhandle	0	0	0	0	0	0	0	0	6	6
East	0	0	0	3	3	5	1	2	94	102
Gulf Coast	0	0	0	11	11	6	7	6	125	144
Southwest	0	0	0	7	7	21	11	4	251	287
Total	4	0	0	31	35	99	19	14	882	1,014
Louisiana:										
North	0	0	0	0	0	6	0	4	65	75
Gulf Coast	0	1	0	1	2	14	8	1	29	52
Total	0	1	0	1	2	20	8	5	94	127
Arkansas	0	0	0	1	1	2	0	0	60	62
Mississippi and Southeast	0	0	0	2	2	6	0	0	65	70
Montana	0	0	1	1	2	6	0	4	24	34
Wyoming	0	0	0	0	0	6	0	0	15	21
Colorado, Utah	0	0	0	1	1	0	0	1	6	7
New Mexico	1	0	0	2	3	6	0	2	25	33
California	0	0	0	3	3	7	0	9	131	147
Total United States	13	1	1	67	82	362	28	83	2,643	3,116
Total previous week	8	1	2	59	70					

LA.-ARK.

Dorcheat Deep Test Is Nearing Completion

SHREVEPORT, La.—Phillips Petroleum Co.'s deep test west of the Dorcheat pool in Columbia County was perforated with 40 shots in the Buckner zone at 9,903-13 ft., and then acidized. Production tests had not been made on last report. Work on the well was delayed last week by a fishing job. Total depth is 9,046 ft.

Ouachita County.—The same company obtained a permit to drill a 4,500-ft. test well on the east edge of the old Smackover pool, at 1 Joyce, N½ NE NE 33-15s-15w. It was reported that Phillips expects to core all sands while drilling to secure information to be used by the Arkansas Oil and Gas Commission in a secondary recovery study of the field.

ARKANSAS WILDCAT COMPLETION

Nevada County, SE of Glenville: R. H. Crow 1 Rhinehart, SW SE SW 28-14s-20w, dry, T.D. 3,500 ft., Tokio 2,372 ft., James 3,080 ft.

Louisiana's Unitization Law Upheld by Supreme Court

WASHINGTON, D. C.—The attack on the constitutionality of Louisiana's 1940 legislation authorizing the commissioner of conservation, as a waste-prevention measure, to establish one-well oil and gas drilling units, was dismissed by the U. S. Supreme Court. The court's action, which in effect sustained the Louisiana law, was based on the fact that an order by the Louisiana commissioner under attack had been supplanted by later orders which had not been before the state courts when they passed upon the controversy.

"The appeal will be dismissed for want of a properly presented substantial federal question," said the opinion.

A brief filed with the tribunal on behalf of Secretary Ickes, petroleum administrator for war, asserted that if the Louisiana legislation were declared unconstitutional, "the validity of similar provisions of the statutes of other oil and gas-producing states would be placed in jeopardy."

The litigation involved specifically an order by the Louisiana commissioner establishing compulsory drilling units in the Jeter zone of the Logansport gas field in De Soto Parish.

Permian Basin Oil Leaving New Atlantic Loading Rack

MIDLAND, Tex.—The first trainload of Permian basin crude oil from the new Atlantic Pipe Line Co. loading rack at the Midland tank-car terminal started rolling November 19. Fifty-one tank cars were in the first train.

Twelve hundred cars are en route here for use in moving around 30,000 bbl. daily to the Boston-Philadelphia area where the crude will be processed by Atlantic Refining Co., Standard Oil Co. of New Jersey and Cities Service Oil Co.

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LOS ANGELES, CALIFORNIA

Among the

Drilling Contractors

Ungren & Frazier, Abilene, Tex., are drilling on their own account a 3,000-ft. cable-tool test 10 miles southwest of the Taylor Link pool in Pecos County, Texas. It is their 1 Jasper County School Land, and is on a farmout from Culbertson & Irwin in Jasper County School Land Survey.

T. P. Pike Drilling Co. completed a flowing well for Federal Oil Co. on the Smith property at the northwest end of the Inglewood field, Los Angeles County, California, and this extension work may lead to additional drilling, as a 4,000-bbl. well is rare in California.

Housh & Thompson, Houston, Tex., will drill a wildcat test in southern Colorado County, Texas, for Ohio Oil Co. on a 695-acre tract owned by C. W. McDermott. Location is 4 miles west of Nada and about 5 miles southwest of Garwood. Projected depth is 6,700 ft. to test the Cockfield.

Dunlap & Graham were the successful bidders for a contract to drill a new well for the Hellman estate in the Seal Beach field, Los Angeles County, California, and material will be moved in within the next week or 10 days.

Comanche Drilling Co. has completed a well for C. A. Leonard estate, 5 miles east of Blackwell, Okla., and has moved to the Currey farm, in SE SW 19-28-1e, where surface pipe has been set and cemented for the same operator.

R. M. Perry has been awarded drilling contract on Socony-Vacuum Oil Co., Inc., 4 Varnum, Marr & Hills (Comm.), in SE SE SW 24-1s-16w, Van Buren County, Michigan.

Loffland Brothers, Tulsa, were getting under way at the east offset to Mid-Continent Petroleum Co.'s discovery well in Cleveland County, Oklahoma. The company's second well is the 1 Tubbs, NE SW SE 29-10n-3w.

Rowan Drilling Co., Houston, Tex., has the contract to deepen Salt Dome Oil Corp. et al's 1 Mrs. Dolce Ogden in the South Anahuac area of Chambers County, Texas. This test, in Lot 3, Evan Douthit Survey A-329, will be deepened from 8,149 ft. to 9,500 ft., and contractor is now cleaning out the hole.

John W. Mecom, Houston, Tex., who has been working for J. S. Abercrombie Co. on a number of that company's tests, is reported purchasing a new heavy-duty rig so it may broaden activities in the Gulf Coast area.

Penrod Drilling Co. has contract for an unusually deep well in Central Louisiana. The well is Placid Oil Co. 1 Tremont Lumber Co. in SW SW 14-9n-2e, La Salle Parish. It will go to 10,000 ft.

Noble Drilling Co. has the contract to drill Stanolind Oil & Gas Co.'s new test in the Holly Ridge area of Tensas Parish, Louisiana. The test is to be carried to the lower Tuscaloosa sand.

Blackwell Oil & Gas Co., Cushing, Okla., has been awarded drilling contract on a test Howard S. Branin, of Houston, Tex., and L. C. Harrison, of Lubbock, Tex., will drill to 7,200 ft. on a block of 8,000 acres in northwestern Kent County, Texas.

Perry Busk has been awarded drilling contract on F. T. Canon 1 Della Morgan, in NW SW SE 31-1n-13w, Allegan County, Michigan.

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CORPORATION

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Time out during a dual completion in the Wimberly field, Jones County, Texas. From right to left: Edgar Davis, drilling and production superintendent, Butler & Horne Drilling Co., Abilene, Tex.; B. H. Hilburn, superintendent for Harry Hines, independent producer, and Fred Leach, acid department, Halliburton Oil Well Cementing Co.

Crow Drilling Co., Shreveport, La., will drill David M. Lide's wildcat in Tensas Parish, Louisiana. This is the 1 fee in the Hollywood Plantation.

Penrod Drilling Co., Dallas, Tex., will drill Hassie Hunt 10 Crowell-Spencer Lumber Co., proposed 10,000-ft. Wilcox test on the north flank of the Pine Prairie dome in Evangeline, Parish, South Louisiana. This test is in 23-3s-1w, north of west flank Wilcox production in the area.

Clifford Perry has the drilling contract on the William A. Firth 1 John F. and Mary W. Miller, in SW SE NW 9-13n-11w, Newaygo County, Michigan.

Stuart Godfrey will drill on contract the W. H. Clock 1 Kerr, in NW NW SE 13-1s-16w, Van Buren County, Michigan.

Drilling & Exploration Co. has been awarded the contract for drilling a new well for Union Pacific Railroad Co. in the Wilmington field, Los Angeles County, California, and spud will be made as soon as a crew becomes available.

Sterling Drilling Co. is the name of a new firm which will make its headquarters at Sterling, Kans. H. E. Billman of St. Louis, Mo., is president, and Rollin Mead, of Sterling, is vice president. John Ogletree, of Sterling, is the firm's drilling superintendent.

Parker Drilling Co. has the drilling contract on Humble 1 Hurst, in SW 33-5s-8w, Greene County, Mississippi, which was drilling below 11,800 ft.

Lunes Oil Co. has the contract for drilling 1 W. A. Handy, a wildcat test in the James O'Reilly Survey of Bee County, Texas, for Siosi Petroleum Co.

D. P. Blevins has the drilling contract on the John E. Belt 1 Mrs. A. A. Webb, in SW 3-8n-5e, Catahoula Parish, Louisiana. Contract is for 4,500 ft.

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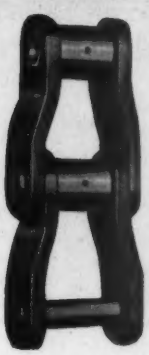

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PERSONALS

Natural Gasoline Making Enduring Claim on Career

P. S. MAGRUDER, who was advanced a short time ago from assistant manager to manager of the gas department of General Petroleum Corp., Los Angeles, Calif., was born in Texas but spent his earlier years in New Orleans.

He joined the Gulf Oil Corp. as a roustabout in 1917 and was assigned to the construction job on the Caddo Lake, Louisiana, natural-gasoline plant, the forerunner of modern natural-gasoline plants using compression and refrigeration methods in natural-gasoline recovery.

With the discovery of oil in West Texas, he resigned from Gulf Oil Corp. and joined the Texas Pacific Coal & Oil Co. to take charge of the natural-gas and gasoline department. He remained with this company until 1925.

Magruder entered the employ of General Petroleum in 1925 and was placed in charge of the gas laboratory. In 1929 he was advanced to general superintendent of the gas department and subsequently became assistant manager of the gas department which position he held until his recent promotion to manager. He was one of the organizers of the California Natural Gasoline Association and served as chairman of the technical committee of the association in 1933-35. He was elected vice president in 1938-39 and served as president in 1939-40. Currently, he is director and a member of the executive committee of the C.N.G.A. and is a member of several committees in PAW's District 5.

O. D. Harper, formerly superintendent of Carter Oil Co.'s St. Elmo district in Illinois, has been placed in charge of the company's operations in the Dix district in that state, with headquarters in Carmi. He is succeeded by **T. K. Whittington,** for the past 2 years assistant district superintendent at St. Elmo. **H. R. Shannon,** who was superintendent at Carmi, has been assigned to supervision of properties recently acquired by Carter in Wyoming and Montana. **H. V. Horner,** who was a senior petroleum engineer for the company at Owensboro, Ky., has been appointed district engineer under Shannon.

Harry V. Klug, who was assistant director of materials in the Chicago office of the Petroleum Administration for War, has been transferred to the Tulsa office, taking the place of **S. R. Clinksales,** who resigned as director of materials in District 2. Clinksales this week resumed his former position with the Frick-Reid Supply Corp., Tulsa, in the tubular sales department.

Capt. Peter J. Sigona, a native of Sicily and master of a Gulf Oil Corp. tanker, last week at New York was awarded the Merchant Marine Distinguished Service Medal. By clever maneuvering and fast thinking, Sigona was able to elude five torpedoes which had been fired at his 75,000-bbl. cargo of Navy oil. The sixth torpedo just glanced off the bow of his vessel.

H. B. Stearns, who has been scout for Shell Oil Co., Inc., in the Ardmore, Okla., area, has been transferred to the company's land department office in Wichita Falls, Tex. **A. E. Palmer,** formerly scout at Centralia, Ill., takes Stearns' post at Ardmore.

W. H. Esser, Shell Oil Co., Inc., has been named president of the Petroleum Motor Transport Association of Oklahoma by a committee selected to nominate officers to be voted on December 16. For first vice president the committee named **Homer Newby,** Cities Service Oil Co.; second vice president, **C. E. Jackson,** Mid-Continent Petroleum Corp.; secretary-treasurer, **J. D. Ward,** Tide Water Associated Oil Co. New directors nominated are **Paul Bray,** Skelly Oil Co.; **C. J. Martin,** Phillips Petroleum Co., and **Dal Clark,** Stanolind Pipe Line Co.

J. M. de la Garza, manager of the production division for Petroleos Mexicanos, Mexican Government petroleum agency, recently completed a trip through the Mid-Continent area in the interest of arranging materials and personnel for meeting the expanded operating program in 1944. While in Tulsa he was the featured speaker at a meeting of the Nomads. He was accompanied by **Alfred F. Smissen,** manager of Franco Dominion Development Corp. de Paris Francia, and **Joel S. Quinones,** Mexican consul, both of Oklahoma City, Okla.

J. M. de la GARZA

Capt. Chester R. Kuhns, who was in charge of engineering, department of production, for Mid-Continent Petroleum Corp., Tulsa, before he entered the Army Air Corps at the outbreak of the war, has been stationed in North Africa during the last 18 months and now is being transferred to an American base.

George P. Alden, son of the late John Alden, who was supervisor of the Mid-Continent region of the U. S. Geological Survey when he died in 1937, has joined the staff of the organization his father served. He is assistant petroleum engineer, specializing in secondary-recovery operations in Oklahoma, with headquarters in Tulsa. He is a graduate of the University of Tulsa.

G. M. McLaughlin, of Sherman, Tex., has been appointed secretary and treasurer of Pipeline Contractors, Inc., according to **E. B. Stovall, Jr.,** also of Sherman, president of the company. He succeeds **R. W. Jernigan,** who is no longer affiliated with the company. McLaughlin has been as-

sociated with Stovall in business for the past 3 years.

Samuel F. Pratt, Oil City, Pa., who last week resigned as general secretary of the Pennsylvania Grade Crude Oil Association, effective January 1, will become vice president of the Union Trading Co., Inc., New York, at the start of next year. Union Trading is headed by **Joseph Schneider** and is affiliated with Societe Commerciale des Produits du Petrole in France and the Delaware Oil Co., Ltd., in England.

Rodger R. Patton, of Tulsa, for the past 3 years geologist for H. F. Wilcox Oil & Gas Co., has resigned to head the geological staff of Falcon-Seaboard Drilling Co.

L. M. Ayers, industrial relations manager of Peoples Natural Gas Co., Hope Natural Gas Co., and East Ohio Gas Co., has been appointed chairman of the personnel committee of the American Gas Association. The committee is engaged in a continuing study of industrial relations problems of the gas industry. Before taking his present post with the three gas companies, Ayers was employed as industrial relations manager by South Penn Oil Co., Guffey-Gillespie Oil Co., and Carter Oil Co.

Donald T. May, John F. Buckwalter, and **Maynard M. Stephens** have joined **Harry M. Ryder** and **David Scott** as partners in the firm of Ryder-Scott Co., petroleum engineers, in Bradford, Pa. The organization will retain its present name.

Ernest C. Breeding, assistant comptroller of the Texas Co. and **E. H. Mueller,** treasurer of Shell Pipe Line Corp., both of Houston, Tex.; **Ralph A. Cuthbertson,** general auditor of Cities Service Oil Co., New York, and **H. O. King** and **F. S. Slick,** comptroller and assistant comptroller, respectively, of Ohio Oil Co., Findlay, Ohio, have been elected members of the Controllers Institute of America.

Frank Phillips, chairman of Phillips Petroleum Co., Bartlesville, Okla., has added a special gift of $70,000 to the Frank Phillips Foundation fund in commemoration of his seventieth birthday, which he celebrated November 28. The Frank Phillips Foundation, Inc., which devotes its funds to furthering youth movements as well as to scientific, religious and educational purposes, has been built entirely by contributions from personal funds of Mr. and Mrs. Phillips. In addition to his regular contributions to the foundation, Phillips, on his birthdays, has matched in thousands of dollars the years of his life. Important among the youth movements sponsored are Boy Scouts, Girl Scouts and special scholarships for children of Phillips Petroleum Co. employes.

Dr. John R. Fanshawe, geologist for PAW Reserves Division, District 4, with headquarters at Denver, has been promoted to director of the district.

T. E. Swigart, president of Shell Pipe Line Corp., Houston, Tex., and chairman of the board of directors of the Houston Symphony Society, was the principal speaker at a dinner given Wednesday of this week in Oklahoma City by the Oklahoma State Symphony Society.

Mark M. Garnett, formerly petroleum engineer in the Agua Dulce field, Jim Wells County, Texas, for United Gas Pipe Line Co., Shreveport, La., was advanced recently to lieutenant (j.g.) and is stationed at Boston, Mass.

Allen Williams has resigned his post in the geological department of Midstates Oil Corp., Houston, Tex., where he had been for 6 years, and has become an independent operator. He will remain in Houston.

G. W. E. and **E. E. Wolfford, J. B. Ray,** and **Walter Lyon** have organized Rocky Branch Oil Co., of Grayson, Ky., to operate oil properties.

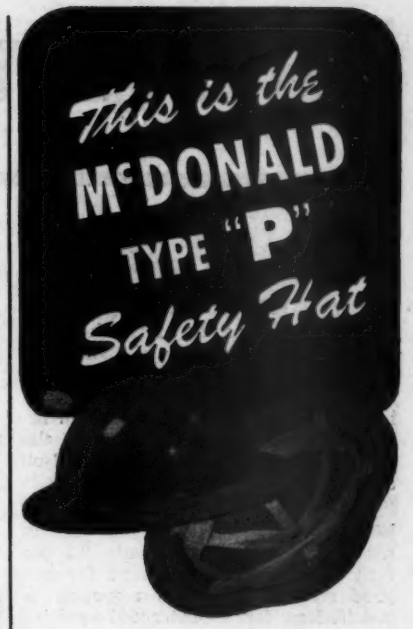
Col. P. A. Frye, secretary of the Louisiana Public Service Commission, speaking before the New Orleans Traffic Club last week, declared the state's known reserves of natural gas would be exhausted within the next 20 years at the present rate of withdrawal. He opposed shipments to other states.

William G. Jackson, for 8 years with Stanolind Oil & Gas Co., has been made associate petroleum engineer in the U. S. Bureau of Mines, with headquarters in Farmington, N. M. He is helping in the development of a helium field.

Eris Bucher, geologist, resigned his position with Ohio Oil Co., in Midland, Tex., and has joined the staff of Standard Oil Co. of Texas in the same city.

W. S. Eggleston, chief petroleum engineer for Union Oil Co. of California, Los Angeles, and **E. P. Tallant,** production engineer, are in Montana in connection with property acquired by Union in that area. They are expected to return to Los Angeles in the near future.

Clifford A. Barkell, of Shell Oil Co., Inc. has been advanced from junior engineer to assistant geologist and transferred from Ventura, Calif., to Great Falls in the Rocky Mountain area.



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Market Developments

East Coast

NEW YORK.—Confidence expressed at the beginning of the heating-oil season as to ability of the industry to meet demands for fuel oil and kerosene during the coming winter has been weakened by failure to increase stocks of kerosene and the steady decline in residual fuel-oil stocks.

During the past 6 weeks stocks of kerosene, only about 50 per cent of normal, have increased only 2.5 per cent. In view of the demand for this product, the supply is regarded as insufficient for a protracted spell of cold weather. Inability to increase kerosene stocks is attributed to the aviation-gasoline program, which results in lower kerosene yields. With more refining capacity entering the 100-octane program, it is questionable if this condition will be improved.

In the same period inventories of residual fuel oil have been declining steadily. Proportionately heavy fuel oil is still in the best shape of any of the major products, but the consistent decline which has reduced total stocks about 8.5 per cent indicate that the comparatively comfortable position which this product has enjoyed in recent months is being jeopardized.

The position of other major products, gasoline and light heating oil, has improved. A decline in demand has made possible an increase of about 15 per cent in gasoline stocks. Heating-oil stocks have increased about 30 per cent and are approximately two-thirds of normal.

Mid-Continent

PICKUP in requirements for heavy fuel oils, with some Mid-Continent refiners unprepared for it, was reported this week. In some cases railroads, failing to find supplies at accustomed sources, turned to Texas plants.

Refiners said that more than 50 per cent of their gasoline output was going now to the Government for use in the war effort. The mild subsidence in civilian demand reported last week was no longer in evidence, and sales managers were facing the same problem that has plagued them for months, namely, how to make one car of gasoline satisfy the buyer who is begging for two.

Movement of cracking stock—usually straightrun gas oil—to eastern refineries, which formerly constituted a substantial part of the business of Mid-Continent plants, has dwindled in recent weeks until now it is negligible. Erstwhile buyers of this material say that the crude supplies now available by pipe line, tank car, and tankers are yielding enough cracking stock to meet their needs. No fear of unwieldy inventories accumulating in the Mid-Continent area was expressed, however. It was predicted that with completion of the government-sponsored high-octane plant at Duncan, Okla., all the cracking stock formerly shipped to the East would be absorbed.

A falling off in the demand for diesel fuel from the East Coast was reported also. Here too the explanation was that growing supplies of crude were sufficient to meet current needs. There was a decline in inquiries for No. 2 burning oil from the East, but the lessened demand was more than counterbalanced by a rising volume of orders from northern states.

There was no sign of letup in the demand for kerosene. Natural gasoline was so scarce that buyers with long-established sources of supply were virtually the only ones able to get any.

A.P.I. REFINERY REPORT

Week Ended November 20, 1943

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	143	2,272	323	1,087
Ind., Ill., Ky.	737	13,336	2,336	6,639
Okla., Kan., Mo.	351	6,788	1,187	2,344
Censored area*	2,164	31,058	18,560	23,022
Rockies	101	1,197	747	482
California	696	14,345	38,909	12,218
Total 11-20-43	4,192	68,996	62,662	45,772
Total 11-13-43	4,134	68,810	62,647	45,518
Total 11-21-42	3,731	74,745	77,796	50,085

*Reports combined on East Coast, Texas Gulf Coast, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines estimate)

Week ended:	Bbl. of crude*
November 20, 1943	239,896,000
November 13, 1943	238,404,000
November 21, 1942	235,305,000

*Excludes unrefinable California stocks.

Gulf Coast

HOUSTON, Tex.—Supplies of regular motor fuel available in the Gulf Coast refining district continued to shrink this week as an increasingly high percentage of charging stock was earmarked and set aside for processing in aviation-gasoline plants scheduled to start production in the near future. Preparations to make maximum use of new processing facilities for manufacture of aviation gasoline have been intensified as the construction of plants progresses, bringing the question of adequate charging stock into the most critical position of all supply problems.

Urgency letters from the War and Navy departments, emphasizing importance of speediest possible completion of aviation-gasoline plants, have been supplemented by special instructions from the Petroleum Administration for War. All obstacles to fullest utilization of facilities for production of military aviation fuel are being removed by drastic action whenever conditions warrant.

Meanwhile, Gulf Coast plant operators are preparing to start regular shipments of fuel products through the WEP 20-in. line which is practically completed to the East Coast.

Pacific Coast

LOS ANGELES, Calif. — With the advent of cooler weather the lessened volatility in motor fuel has already become evident. Difficulty is encountered in starting cold motors even with Ethyl grades of gasoline. the octane number of which has been reduced along with house brands. Greatly increased battery business is expected.

Motorists are faced with the problem of finding stations with sufficient stocks of gasoline, as marketers have started rationing or prorating deliveries to service stations, usually on the basis of July-August deliveries. It is becoming apparent that a critical period lies ahead. Gasoline stocks were reduced 1,000,000 bbl. during October and with another substantial cut made in November the outlook is not encouraging.

There is a trend toward reduced marketing operations by disposal of gasoline stocks to those having favorable outlets. In addition, refiners are not going to maintain large stocks of high-test gasoline indefinitely, but are starting to move them to best advantage. Gasoline prices have strengthened during the past few weeks. Price advances were confined to products selling below ceilings. Fuel oil prices are also strong, in view of a reduction approximating 100,000 bbl. daily in fuel-oil stocks. Refinery capacity is taxed to meet the present abnormal demand.

Refinery Prices

(Prices as of November 30, 1943)

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	80†	74-76	70-72	68-70	63-66
Mid-Continent*	.....	.....	6.000	.....	5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	§5.750-6.250	§5.750-6.250	§5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	6.750-7.125	6.255-6.500	5.750-6.125	5.125-5.500

*Basis Group 3. †1939 C.F.R. (research method). §Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C‡
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	†1.35-1.45	1.10-1.15
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †Gravity range ‡Pacific Specification 200.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625	3.500	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	§1.10-1.15
Gulf Coast	3.750-3.875	.....	1.35	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel. ‡Pacific Specification 300. §Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D. 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	22.00
Steam refined:	
600 dark green (untreated)	9.00

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
650 flash	17.00	17.50

Neutral Oils

Vis. at 100° F. (except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

CALIFORNIA—

200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00

Neutral Oils

200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:	
Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis. at 70° F., 3 color:	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.s. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.95	5.50	10.50
Boston, Mass.	14.90	4.50	10.10
Burlington, Vt.	16.00	5.50	10.30
Buffalo, N. Y.	16.20	5.50	10.90
Dover, Del.	16.70	5.50	12.30
Hartford, Conn.	15.60	4.50	10.00
Manchester, N. H.	17.30	5.50	12.10
Newark, N. J.	15.20	4.50	10.00
New York, N. Y.	16.10	5.50	10.10
Philadelphia, Pa.	16.20	5.50	11.90
Pittsburgh, Pa.	16.70	5.50	12.30
Portland, Me.	16.30	5.50	10.30
Providence, R. I.	15.00	4.50	9.90
Washington, D. C.	15.20	4.50	11.30
Average 14 cities	16.02	5.14	10.85

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	14.10	4.50	10.60
Cleveland	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	10.10
Detroit, Mich.	14.40	4.50	10.00
Fargo, N. D.	16.90	5.50	11.60
Huron, S. D.	16.30	5.50	11.00
Indianapolis, Ind.	15.60	5.50	10.10
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.80
Minneapolis, Minn.	15.90	5.50	10.60
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	13.30	4.50	8.70
Average 14 cities	17.46	5.57	9.84

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11.50
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.95	7.50	.....
Charleston, W. Va.	19.25	6.50	13.30
Charlotte, N. C.	20.10	7.50	11.30
Jacksonville, Fla.	18.90	8.50	9.50
Jackson, Miss.	17.50	7.50	†9.00
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	17.90	8.50	10.50
New Orleans, La.	17.75	8.50	10.00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10.50

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	13.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.50	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.00
San Francisco, Calif.	14.50	4.50	11.00
Seattle, Wash.	17.00	6.50	13.00
Average 3 cities	16.17	5.83	13.03
Average 50 cities	16.59	5.96	10.92

Job Evaluation in the Petroleum Industry

(Continued from page 45)

might be compared using factor to factor comparison. The value of each factor is reflected in cents per hour. These are not actual rates of any company and are only used to illustrate how mathematical values can be assigned to factors and a measuring stick established whereby all jobs can be evaluated by interpolating between established values or by extrapolating beyond values established.

The mean value of the monthly ranges shown in Table 2 corresponds to the mean value of the point range in cents per hour. In this case, the salary range was arbitrarily set at 33⅓ per cent, that is, the maximum is approximately 33⅓ per cent above the mimimum using the mean value of the range as a starting point. Depending on management's views this range might be as high as 40 per cent or as low as 20 per cent. The purpose of having a salary range is to provide some means of recognizing differences in individual efficiency. In most cases individuals starting on a job are not able to perform a given set of duties as efficiently as a person who has been on the job for a number of months or years, and it would be a sound policy to start learners or beginners at below the mean value of the salary range until they have had a chance to demonstrate their value. By the same token, the more efficient individuals should be paid above the mean value of the salary range. Where job evaluation and salary ranges are used, a system should be established whereby supervisors and salary committees can review the merits of each individual periodically, preferably annually, and adjust salaries within the range.

The job study and the job specification, originated by the job analyst and checked by the supervisor, should answer the question "What is the job?" The rate or salary range recommendation of the job analyst and the subsequent opinion of the department head assists management in answering "What is the job worth?"

The authors wish to express their thanks to E. H. Blum, L. A. Sunkel, and Samuel L. H. Burk for criticisms and suggestions and to Atlantic Refining Co. for permission to publish this article.

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2. "Job Evaluation," by D. W. Weed. Production Series No. 111. 1939. American Management Association.
3. "A Case History in Salary and Wage Administration," by Samuel L. H. Burk. Personnel, Vol. 15, No. 3, 1938. American Management Association.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Texas	West Texas*
18-18.9	$0.80	....	....	
19-19.9	.84	....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	....	1.07	1.30	.94
32-32.9	....	1.09	1.32	.96
33-33.9	....	1.11	1.34	.98
34-34.9	....	1.13	1.36	1.00
35-35.9	....	1.15	1.38	1.02
36-36.9	....	1.17	1.40	1.04
37-37.9	....	1.19	1.42	1.06
38-38.9	....	1.21	1.44	1.08
39-39.9	....	1.23	1.46	1.10
40 and above	....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

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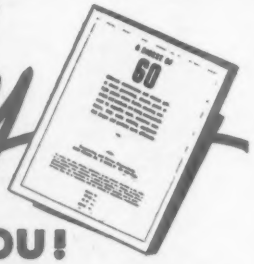

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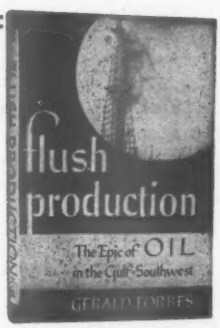

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Buoyancy-Type Instrument Controls and Indicates Liquid Level

With the announcement of its new Level-Buoy, Taylor Instrument Companies of Rochester, N. Y., adds to its line a buoyancy - type instrument

which both controls and indicates liquid level. The new instrument employs the Taylor Fulscope control mechanism with either completely adjustable sensitivity for smooth throttling level control, or automatic reset for averaging of liquid level with a minimum disturbance to the process.

A torque tube transmits the level changes to the instrument mechanism. This eliminates a stuffing box with its need for lubrication or packing and gives a closed system which eliminates leakage. The torque tube is interchangeable with the ones used in the Taylor Aneroid Manometer which is a real advantage to instrument users in minimizing inventories of spare parts. There are no internal pivots to cause friction or wear.

The Level-Buoy handles liquids with specific gravities between 0.2 and 2.0. It is available in the following standard ranges: 14-in., 32-in., 60-in., 72-in. and 120-in.

New Name for Filter Manufacturers

Staynew Filter Corp., of Rochester, N. Y., will henceforth be known as Dollinger Corp., taking this name from Lewis L. Dollinger, president and founder of the company.

Recently expanded manufacturing facilities have made possible the development of new products which are soon to be announced. Since certain of these are products other than filters, it seemed advisable to change the company name to one of a more general character.

The well-known Staynew and Protectomotor trade-marks will continue to be used in connection with all filter products.

There is no change whatever in the management, financial organization, or general policies of the company.

Hanlon-Waters Adopts 28-Hour Schedule

Hanlon-Waters, Inc. Tulsa plant, which is manufacturing portable gasoline pipe-line equipment for army use, last week went on a "28-hour-day" schedule in an effort to meet its production schedule which has been increased to help fulfill army requirements. For many months the company had maintained its production at 100 per cent of its quota, but a mechanical change in the equipment manufactured delayed the production schedule, forcing heroic measures to catch up.

The firm consequently went on a schedule calling for two 14-hour shifts a day, with the two shifts overlapping 2 hours daily. The workers sacrificed their Thanksgiving holiday and other days off to full-speed production, and on Thanksgiving established a new 1-day record for production and shipping. Many of the employes live outside Tulsa, and Millard F. Waters, president of the company, made arrangements with a Tulsa hotel for accommodations for those who live too far away. Rooms and meals are provided the workers, assuring sufficient time to rest.

Gun Perforator Bullet Introduced by Lane-Wells

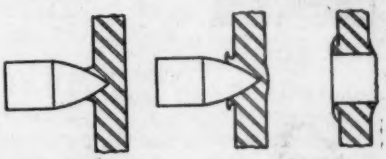
Lane-Wells Co., 5610 South Soto Street, Los Angeles, Calif., has developed a new gun perforator bullet which provides greater penetration and larger drainage area from each shot.

The outline shape of the ogival point is in the form of a pointed arch. This produces a thicker extreme point of greatly increased strength. No chips break off the point to deflect the course of the bullet or to affect penetration.

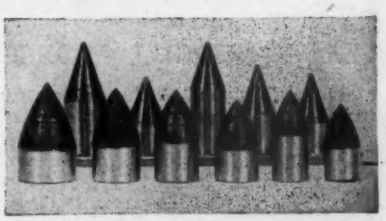
Improved flight stability of the ogival bullet has been demonstrated in tests made through three strings of casing where the bullet's course has been straight after perforating the outside casing. In single strings deep penetration in the formation is achieved because the bullet passes through the casing without deviation even when striking the casing angularly. As the bullet enters the formation, point foremost, with practically no tendency to tumble, maximum penetration is achieved, resulting in deeper passage in the formation.

The ogival shape permits a shorter bullet of the same weight which in turn provides a greater distance of travel within the barrel since the base of the bullet remains at the same place. This results in a longer effective barrel which gives greater velocity and, consequently, greater penetration.

The casing perforation is greatly improved by use of the ogival bullet. The hole is round, smooth and uniform. In perforating the casing the ogival point flows the metal back out of its path and folds the bead back tightly against the casing, reducing the sharp projections and danger of damage to tools run following perforating.



The ogival shape flows the casing metal back into a tightly folded bead as the perforation is made



Comparison of Steelilo ogival-point gun perforator bullets with the old conical-point bullets shows advantages of new design. The ogival-point bullets are shorter with a stronger piercing point and give greater penetration

The combination in the ogival point bullet of a strong piercing point, the center of gravity moved forward to insure straight flight, a point so proportioned as to give nearly constant displacement of the metal pierced; a bullet whose length to weight ratio is more favorable, and one which produces a hole in the casing having a well rounded, smooth bead, is responsible for considerably greater

penetration and better all-round performance.

Complete details of the new ogival-point gun perforator bullet can be obtained from Lane-Wells Co., 5610 South Soto Street, Los Angeles 11, Calif.

Ben F. Kelly Co. New Tulsa Supply Firm

Ben F. Kelly Co., with offices and assembly plant at 18 South Madison, Tulsa, has recently been organized. In addition to acting as manufacturer's representative for leading lines of drilling and producing equipment, this company will continue to handle manufacture and sales of the well-known Kelly specialties, the Kelco safety spinning line cathead, the Kelco air-operated safety rotary pipe slips, and the Kelco safety air-operated wire-line oil saver.

Ben F. Kelly's two sons have joined him in formation of this new company. W. L. Kelly will have charge of assembly and machine construction; V. A. Kelly will handle field service responsibilities for the company.

Among Equipment Men

Ross Opens Office In San Francisco

R. N. MATHEWS

A San Francisco factory branch office has been opened by Ross Heater & Mfg. Co., Inc., manufacturer of all types of tubular heat exchangers, oil and water coolers, heaters, condensers, steam jet air ejectors, tube expanders and similar equipment.

Manager of the office, located at Central Tower, 703 Market Street, is Richard N. Mathews, who will devote his time exclusively to the sales-engineering of Ross equipment.

Transferred to the Pacific Coast from the company's Chicago office, Mathews has been with Ross for 10 years, except for a recent period with War Production Board in Washington, D. C.

In addition to the San Francisco office, Ross equipment is handled on the Pacific Coast by R. D. Morse, Seattle, Wash., and W. S. Turner & Co., Portland, Ore.

Thompson Joins Barrett & Hilp, of San Francisco

W. A. Thompson, Jr., formerly construction superintendent for E. B. Badger & Sons Co., Boston, Mass., and also formerly associated with Sun Oil Co., is now manager of the oil refinery and chemical-plant construction department of Barrett & Hilp, general contractors of San Francisco, Calif.

SEABEE OFFICIAL ADDRESSES LOS ANGELES NOMADS

Guest of honor at the November meeting of the Los Angeles chapter of Nomads was Comdr. Bart W. Gillespie, U.S.N.R., regimental commander of the Seabees in the Aleutians for the past 13 months. Commander Gillespie has been in California on leave since the latter part of October, and is due to report to Washington soon for his next assignment.

In his address, Commander Gillespie gave unstinted praise to the work of the Seabees, yet he never mentions them in relation with the work done in the Aleutians without including the equally fine work of the U. S. Army engineers.

Commander Gillespie was first sergeant of engineers during World War 1. He received divisional citation after the battle of the Argonne and later was recommended for the Distinguished Service Cross.

After returning from France, Bart was employed as geologist for Atlantic Gulf and West Indies Corp., doing geologic mapping and reconnaissance work in Mexico. He directed the preliminary engineering and field construction work for Cia de Petroleo Ganso Azul near the headwaters of the Amazon River in 1936-38. He also served as drilling adviser for Y.P.F. with headquarters in Buenos Aires. And just before entering the United States Naval forces in the present war, he was associated with Roy Hitchcock (now a lieutenant in the Navy) in the sale of Wilson drilling equipment in California and foreign fields.

Amphibious boys and Seabee divers display some of their Attu trophies

Link-Belt Co. Announces Promotions

E. J. BURNELL

W. C. Carter, president, Link-Belt Co., Chicago, Ill., announces the following promotions:

Edward J. Burnell, heretofore vice-president and general manager in charge of Pershing Road plant operations and central division sales, has been transferred to the executive office of the company, 307 N. Michigan Ave., Chicago. In his new position he will be vice president in charge of sales for the entire company.

Directly assisting Mr. Burnell will be Nelson L. Davis, sales manager for materials handling machinery; William H. Kinkead, sales manager for power transmission machinery; and C. Walter Spalding, sales manager for power-transmission equipment required by original-equipment manufacturers and duplicate machinery accounts.

Harold L. Hoefman, manager of the company's Atlanta plant, succeeds Mr. Burnell as general manager of the Pershing Road plant.

Richard B. Holmes, district manager at Indianapolis, has been appointed manager of the Atlantic plant to succeed Mr. Hoefman.

David E. Davidson, district engineer at the company's Detroit office, has been named district manager at Indianapolis, to succeed Mr. Holmes.